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KNOWLEDGE CENTER: ENTERPRISE NETWORKING

Cost-Conscious Nets

In a recession, IT managers have to be highly focused on the bottom line as they deploy wide-area networking technologies. Some are finding that they can meet their WAN needs, while keeping costs down, with new options such as voice over IP and metropolitan-area networks.

Special Report begins on page 31.

Besides the wealth of material in our pages, check out the online resources and feature stories in our Knowledge Center on Enterprise Networking: www.computerworld.com/q?k1200

Quick Link

- VPNs offer an affordable, safe way to connect dispersed networks.
- How to secure a telecommuter's office with firewalls and routers.
- The city of Chicago is planning a huge metropolitan-area network.

UBS SNAGS ENRON'S ONLINE ASSETS

But faces challenge of winning back customers

BY MICHAEL MEEHAN

As scandal continued to surround Enron Corp. last week, UBS Warburg quietly snatched up the IT infrastructure of the energy giant's online gas and power trading operation, for no money down.

The deal could turn out to be a coup for UBS, since many experts considered the trading operations to be the keystone in Enron's one-time position as the seventh-largest company in the U.S. But UBS faces several challenges in its bid to return EnronOnline to glory, including persuading energy traders to bring their business back to the online exchange.

UBS plans to hire many of the 800 people now employed in Enron's trading operation and is eyeing IT staff in particular, said UBS spokesman David Walker.

"Traders are very important, but equally so are the tech personnel who will be needed to

Enron, page 65

FEDS' CONFUSION GREETS AIRLINES

Agencies waffle on eve of security deadline

BY JENNIFER DISABATINO

Two days before the Jan. 18 deadline for U.S. airlines to comply with new baggage screening regulations, the federal government appeared to be in a state of utter confusion about exactly what it was requiring.

On Jan. 16, U.S. Department of Transportation Secretary Norman Mineta gave a speech in which he indicated that each bag loaded onto an originating flight would have to be matched to an onboard passenger. That's a vastly stricter guideline than what the airlines had been preparing for: using bag matching as just one option in multifaceted screening plans.

In some cases, particularly in airline hubs, bag matching relies upon laser scanners, wireless devices and passenger databases. To implement that for every passenger, even where the technology existed, would have been extremely

Airlines, page 16

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8 A spectrum allocation proposal by Nextel Communications has private wireless users such as FedEx fuming.

10 Most Wall Street IT managers say they haven't even begun preparations to meet straight-through trade processing requirements.

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ONLINE

Gone With the WINS

DNS has taken the reins from the Windows Internet Naming Service (WINS) as the preferred name service in Windows 2000. But what do you do if you already have a Unix domain name service?
www.computerworld.com/community/os

Packet Traffic Cop

This week's Emerging Companies feature looks at NetReality, whose technology aims to optimize available wide-area network bandwidth by giving priority to critical application packets.
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KNOWLEDGE CENTER: ENTERPRISE NETWORKING

31 Cost-Conscious Nets

You're an IT manager, not an accountant, but saving money on your network could save your job in these tough economic times. This special report offers ways to cut costs — from taking a close look at telecom bills to spot waste to renegotiating networking contracts for better deals.

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ONLINE: A software upgrade to its existing PBX enables Lego Systems to test voice over IP without disrupting its existing phone system. **www.computerworld.com/q?26411**

38 Dow Blazes VOIP Trail Dow Chemical's new 50,000-user integrated IP voice/data network is a pioneering effort that other companies may try for themselves.
ONLINE: Officials at Dow Chemical and EDS share the lessons they learned while deploying Dow's global VOIP network.
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ONLINE: Chicago's $30 million-plus telecommunications budget provides incentives for building a metropolitan-area network. **www.computerworld.com/q?26410**

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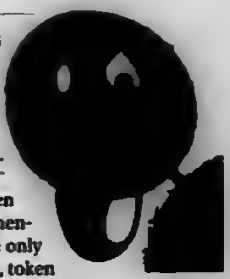

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ONLINE: Read about the Holy Grail of authentication: directory services that store user account information such as passwords and biometrics.
www.computerworld.com/q?26022

54 Safe and Secure Employers have been making network security an IT priority in the past year. That trend and an insufficient supply of skilled professionals are making network security IT's next hot job market.
ONLINE: For more on the GIAC and CISSP certifications that employers look for in network security personnel, visit us online.
www.computerworld.com/q?26056

55 Nicholas Petreley lays down his own law to match those of illustrious predecessors Gordon Moore and Robert Metcalfe.

ILLUSTRATION BY BILL SCHWARTZ

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TAMING THE VPN
Solid but expensive virtual private network products abound, but an enterprise VPN is still tricky to manage. Have you considered outsourcing?
www.computerworld.com/q?26077

SECURING THE OFFICES OF TELECOMMUTERS
Home offices pose big IT security challenges. Personal firewalls and routers for small offices can deliver remote management capabilities and improved security.
www.computerworld.com/q?26076

VPNs DELIVER THE GOODS
The Internet revolution brought a simpler, less expensive option for interconnecting LANs. A carefully planned VPN offers an affordable, safe way to connect dispersed networks.
www.computerworld.com/q?26299

Quick Link

AT DEADLINE

Eli Lilly Settles FTC Privacy Charges

Eli Lilly & Co. agreed to settle privacy-related charges brought by the Federal Trade Commission (FTC) after the Indianapolis-based drug maker inadvertently divulged the e-mail addresses of about 600 Prozac users last summer because of a programming error. As part of the deal, the FTC said, Eli Lilly will implement a more stringent information-security program. The company won't have to pay any fines.

Sun Reports Big Loss, Drop-off in Sales

Sun Microsystems Inc. reported a $431 million loss for its second quarter ended Dec. 30, as revenue plunged 39% from $5.1 billion in the same period a year earlier to $3.1 billion. But Michael Lehman, Sun's chief financial officer, said the company is "showing signs of progress" and hopes to return to profitability in its fourth quarter, which ends in June.

IBM, Nextel Team on Mobile Applications

IBM and Reston, Va.-based wireless service provider Nextel Communications Inc. said they plan to jointly develop mobile e-business applications aimed at corporate users in the U.S. Nextel also agreed to outsource management of its customer service operations and systems to a team led by IBM in a deal valued at $1.2 billion over eight years.

Short Takes

DELL COMPUTER CORP. increased the business forecast for its fourth quarter ending Feb. 1, saying revenue will likely total about $8 billion. That's up from an earlier projection of $7.6 billion. . . . Framingham, Mass.-based IDC and San Jose-based DATAQUEST INC. both said PC shipments dropped about 5% on a worldwide basis last year.

Users: ASP Benefits Still Worth the Risk

But financial problems at service providers make backup plans critical

BY JAIKUMAR VIJAYAN

KEEP THE FAITH But have a Plan B, just in case. That's the advice from users and analysts when it comes to outsourcing applications in the face of the financial troubles plaguing major application service providers (ASP).

Two weeks ago, Annapolis, Md.-based USinternetworking Inc. (USi) became the latest ASP to ask for Chapter 11 bankruptcy protection after a string of poor quarters. USi's troubles and those of several other leading ASPs during the past 12 months have prompted some analysts to question the long-term viability of the ASP model.

But ASP users say the benefits of using outsourced applications continue to be significant. Yet, even staunch supporters protect themselves through good contracts and strategies designed to keep their applications alive if their ASP suddenly isn't.

Take human resources consultancy Watson Wyatt Worldwide, for instance. Nine months ago, the Washington-based company outsourced its e-mail services to USi. Despite the ASP's financial woes, service hasn't been disrupted so far, said David Hollingsworth, director of support operations at Watson Wyatt.

"Application availability has been way higher than what we could have achieved ourselves," Hollingsworth said, adding that software costs have become more predictable and easier to manage.

Even so, the company isn't taking any chances. Watson Wyatt has made sure to include "pretty strong language" in its contract with USi that spells out how quickly it needs to get its data back in the event that USi isn't able to continue its services, Hollingsworth said.

Servers that are identical to the ones USi uses to host Watson Wyatt's e-mail services are ready and waiting at a network co-location site. If something goes wrong at USi, Hollingsworth estimates that it would take less than a day to resume e-mail services at the backup facility. The cost of the mirror facility was built into the outsourcing budget, be said.

"Just because you are outsourcing something doesn't relieve you of the responsibility of managing it," be said.

Mitchell Dickerman, CIO at Boston-based advertising agency Hill, Holliday, Connors, Cosmopulos Inc. has another approach. When his company hired Lexington, Mass.-based ASP Surebridge Inc. to run its PeopleSoft modules in 1999, the agency made sure that it owned the servers.

"Our boxes are down the street from us. If our service provider went down, we'd just walk across and take the boxes back home," Dickerman said.

ASP Advantages

An October 2001 study of 53 businesses that used ASPs found that:

- 44% of the organizations experienced a return on investment greater than 100%, and 12% reported ROI of more than 1,000%.
- The average payback for an outsourced application was 1.33 years on an average total investment of $4.2 million.
- The average initial investment was $300,000.

SOURCE: IDC, FRAMINGHAM, MASS.

Oracle Revamps App Pricing; Impact Unclear

Details lacking on new flat-fee plan

BY MARC L. SONGINI AND JORIS EVERS
AMSTERDAM

Oracle Corp. CEO Larry Ellison last week disclosed that the company is modifying the way it prices its business applications by implementing flat per-user fees for power and casual users. But the full ramifications of the pricing change remained unclear.

Ellison said at the European version of Oracle's AppsWorld conference that the new fees are an attempt to simplify the pricing of its E-Business Suite lli applicatinns. License fees for the full suite will be $4,000 per power user and $400 per casual user, he said.

Oracle's previous approach, with separate prices for application modules, "was very complicated," Ellison said. "We had all these complex matrixes." He said the new fees are "the complete price list for everything you want."

The change is similar to the database pricing with flat per-processor fees that Oracle implemented last year. But Oracle couldn't provide full details on how the new pricing will work, saying more information would be available "shortly." A key unknown is how Oracle will define what separates a casual user from a power one.

Hal Kuff, systems and network manager at Tessco Technologies Inc., said the new pricing might make it feasible for the Hunt Valley, Md.-based wireless technology vendor to expand its internal usage of Oracle's applications.

Kuff said be welcomes the recognition that customers such as Tessco have a mix of users, some of whom require full application functionality and others with "inquiry-only and light transaction" needs. But be said he's "anxious to receive clarification on what exactly a casual user is."

Oracle previously made similar distinctions in the pricing for some application modules. For example, the store on the company's Web site lists "user" and "read-only user" prices for its financial applications.

But Katherine Jones, an analyst at Aberdeen Group Inc. in Boston, said an individual end user could qualify as a power user of one module and a casual user of others. She added that companies may prefer to continue negotiating site licensing with Oracle.

"It looks like one of Larry's shot-from-the-hip pronouncements," said Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Daly City, Calif. But the fees do appear to bring Oracle's prices within range of what rival SAP AG charges, he added.

Jeremy Young, president of the Oracle Applications Users Group in Atlanta, said the pricing model "sounds very interesting." But users will need to compare the new prices with what they were paying for the software under Oracle's old licensing approach, said Young, who is a business process manager at Brussels-based DHL Worldwide Network NV.

Evers is a correspondent for the IDG News Service.

Quick Link For more on Apps World, please visit: www.computerworld.com/s/726500 and www.computerworld.com/s/725354

Unregulated Databases Hold Personal Data

Lawsuit seeks details on government use

BY JENNIFER DISABATINO

Io the 2000 presidential election, Florida disqualified thousands of voters because a computerized database search identified them as felons who were ineligible to participate in the election.

Many of those voters weren't, in fact, felons. They had been charged with misdemeanor crimes and should have been eligible to vote.

After following the government investigation of the election that uncovered these errors, Chris Hoofnagle, an attorney for the Electronic Privacy Information Center (EPIC) in Washington, began to look into profiling agencies. Last week, he filed a lawsuit seeking to release information involving the purchase of data on individuals by U.S. government agencies from companies that sell personal data.

The ultimate goal is to have these companies regulated so that citizens have the right and ability to monitor and correct their profiles in these databases, Hoofnagle said.

DBT Online Inc. provided the database against which Florida checked its voter registration rolls to remove ineligible voters. Boca Raton, Fla.-based DBT was purchased by Alpharetta, Ga.-based ChoicePoint Asset Co. before the electioo but after the voter checks, according to ChoicePoint spokesman James E. Lee.

Lee acknowledged the problem and said be's even in favor of regulation because of the potential for misuse. "It's not about the availability of the information, it's about the use," be said.

DBT employees told Florida officials they would get precisely the types of incorrect results DBT did with the kind of query they ran, said Lee.

"Florida knew and said 'OK,' because supervisors would [manually] double-check [the query results]. But that never happened," Lee said. By law, county commissioners are required to do those checks.

ChoicePoint maintains databases of public records, such as court documents and property records, which 7,500 law enforcement agencies across the U.S. use to help in their investigations. Private businesses, such as insurance companies, also use them to conduct fraud mitigation and background checks, Lee said.

Because information is often incorrect in the source documents, Lee said, it would be appropriate for regulation like the Fair Credit Reporting Act. That law lets individuals review their credit reports and submit requests for changes. ChoicePoint, however, isn't regulated by the act.

EPIC said it filed a suit under the Freedom of Information Act after it had been denied informatioo about government contracts with private profiling companies.

EPIC singled out ChoicePoint and Experian Information Solutions Inc., an Orange, Calif.-based subsidiary of Maochester, England-based GUS PLC, that maintains and sells informatioo on U.S. citizens, including credit information, property records, state motor vehicle records, and marriage and divorce data.

Although Experian is regulated under the Fair Credit Reporting Act, citizens may still not be aware that the government is using that data, Hoofnagle said. Among the agencies purchasing the data are the FBI, U.S. Drug Enforcement Agency, U.S. Marshals Service, Internal Revenue Service, U.S. Immigration and Naturalization Service and the Bureau of Alcohol, Tobacco and Firearms, EPIC said.

The U.S. Department of the Treasury didn't respond to requests for information, and the U.S. Department of Justice said it wasn't sure if it had been served with the lawsuit as of press time last week.

"Through the mining of public records and the purchase of credit reporting data, private-sector companies are amassing troves of personal information on citizens for the government," said EPIC's Hoofnagle. "Serious questions exist involving citizen access to profiles, their accuracy and the potential for misuse of personal information."

Keeping Tabs

A partial list of the databases that ChoicePoint maintains:

- Claims and public record data
- Marketing information services
- Vehicle information
- Credit records
- Pre-employment screening
- Background checks
- Criminal reports
- Drug screening and testing
- Negligent hiring and retention
- Child support
- Entitlement agency solutions
- Health care
- Law enforcement
- Asset verification
- Risk management
- Vendor screening
- Identity assurance
- Health care fraud and abuse

Businesses Decry Plan for High-Tech Driver's Licenses

Changes may require upgrades

BY PATRICK THIBODEAU
WASHINGTON

A move in Congress to standardized driver's licenses with encoded, machine-readable data, has promising but potentially costly implications for businesses that want to swipe licenses through readers to authenticate customer identity for everything from airline ticket purchases to convenience store beer sales.

Although a growing number of states are encoding machine-readable information oo driver's licenses, the states aren't all using similar standards or technologies, and that creates problems for businesses such as Clark Retail Enterprises Inc., an Oak Brook, Ill.-based operator of more than 1,330 convenience stores.

"It just costs more when you have multiple standards," said Pat Enright, Clark's IS director. Clark isn't checking licenses electronically because of these technology issues. But Enright said he would like to have that ability, explaining that it would help enforce product age laws and create an audit trail.

Since Sept. 11, Congress has sought to improve the security of driver's licenses by establishing a national means for checking them and by providing an irrefutable unique identifier, such as a biometric, of the bearer.

AT A GLANCE

The Goals

The group representing motor vehicle departments wants changes in the security of driver's licenses.

STANDARDIZATION: Create a uniform, secure and interoperable license.

UNIQUE IDENTIFIER: Use fingerprints and other possible biometrics.

DATABASE: Establish a means for motor vehicle departments to run national checks.

Need for Standards

However, initial work toward a standard has met resistance. Business trade groups are embroiled in a dispute with the Arlington, Va.-based American Association of Motor Vehicle Administrators (AAMVA), which develops licensing standards for state motor vehicle agencies.

Business groups say the AAMVA has set a magnetic stripe specification that isn't compatible with the readers that businesses use to check credit and debit cards.

"Our needs have been ignored," said John Hervey, chief technology officer at the National Association of Convenience Stores in Alexandria, Va. "[The AAMVA] didn't believe they had to satisfy anybody's needs other than their own."

According to Hervey, the 130,000 stores run by members of his group would need $60 million in equipment upgrades to meet the specification.

Gene Kathol, vice president of research and development at Greenwood, Colo.-based First Data Corp., which provides payment services at some 2.6 million merchant locations, said the AAMVA specification would let motor vehicle departments store some driver's license data on the part of the magnetic stripe that the industry has all but stopped using — Track 3. This is a read/write track that businesses say can be easily rewritten by criminals. Readers in use aren't compatible with it.

AAMVA said the data that retailers seek can be gleaned off tracks 1 and 2, and data off Track 3, which includes height and weight, isn't needed to establish identification.

Retail groups and businesses disagree and say the use of Track 3 would be a mistake. "We have diligently worked hard over the last 30 years to get away from it. Why on earth would we want to go back that way?" said Kathol.

Quick Link Adding more data to driver's licenses won't be easy. Read more on our Web site.
www.computerworld.com/q?20532

Nextel Spectrum Plan Riles Wireless Users

Realignment proposal could derail secure wireless bag-match system at top 15 airports

BY BOB BREWIN

FEDEX CORP. could incur expenses of $100 million to reconfigure the wireless system that supports its mobile package-tracking systems under a spectrum reallocatioo proposal developed by Nextel Commuoications Inc. And the shipper is just one of many business and industrial wireless system users who will be slapped with high costs if the proposal successfully makes it through the Washington regulatory rounds, according to the Industrial Telecommunications Association (ITA), an industry group that opposes the measure.

The Nextel proposal is designed to ensure interference-free spectrum for police and fire communications and could soon be formally considered by the Federal Communications Commission.

If approved by the FCC, the plan would reconfigure the 800-MHz spectrum band to reduce interference. The 800-MHz band consists of interleaved channels carrying data from users such as Memphis-based FedEx, police and fire departments and Nextel, which operates a cellular-like radio network in the band, making interference inevitable.

Nextel, a Reston, Va.-based company that's majority owned by cellular phone billionaire Craig McCaw, proposed solving these problems by moving private wireless operations to other bands, clearing the 800-MHz band for itself and public safety agencies.

The FCC could carve out an interference-free slice of the band for public safety users as early as this summer, according to industry sources. At the same time, the National Telecommunications and Information Administratioo is expected to release a report within a matter of weeks outlining the importance of private wireless systems used by "critical infrastructure" industries such as FedEx, ARINC Inc., utilities and railroads.

Strong Opposition

The ITA said the Nextel proposal would be "an unmitigated disaster for America's industrial, transportation and utility sectors." An ITA letter to the FCC added that the Nextel plan could disrupt "mission-critical communications and impose billions of dollars of costs on American businesses to relocate operational communications systems that are not causing any interference to public safety operations."

The proposal could also derail plans by Annapolis, Md.-based ARINC, a leading air-to-ground communications company, to field a highly secure wireless system to support critical airline operations, including bag-matching systems at tbe top 15 U.S. airports, according to Kris Hutchinson, the company's senior director of frequency management. Hutchinsoo estimated that the Nextel plan could cost his company $160 million if ARINC has to shift frequencies and buy new voice and data digital wireless equipment.

Nextel suggested to the FCC that it move private wireless users to the 700- or 900-MHz bands. But Hutchinson said be doesn't know of any manufacturer of digital radios in those bands that are capable of meeting ARINC's requirements.

The Nextel proposal has solid backing from a wide range of public safety communications organizations, including the Association of Public-Safety Communications Officials International Inc. in Daytona Beach, Fla., and police and fire chiefs associations. The public safety agencies would have to shift some spectrum assignments, but Nextel said it would provide $500 million to fund the change, though the company hasn't provided funding to reallocate the private wireless systems.

The private wireless users sharply question the Nextel approach. "[Interference] is a problem that Nextel created but wants to solve at everyone else's expense," Hutchinson said.

Laura Smith, president of the ITA, said public safety agencies "need to have access to interference-free spectrum" but the FCC needs to develop a band plan that will accommodate all users.

Larry Krevor, vice president of government affairs at Nextel, said interference "is just not a Nextel problem," adding that the company's planned band plan would "accommodate all users."

Nextel 800-MHz Band Reconfiguration Plan

- **Would provide public safety agencies** with contiguous and interference-free blocks of spectrum at 806 to 816 MHz and 851 to 861 MHz
- **Would provide Nextel with contiguous spectrum** at 821 to 824 MHz and 866 to 869 MHz
- **Would shift most industrial,** transportation, utility and railway private wireless users to either 700- or 900-MHz bands

SOURCES: NEXTEL WHITE PAPER, ITA, ASSOCIATION OF AMERICAN RAILROADS AND ARINC

Mortgage Vendor Signs On to E-Signatures

Rare deployment for high-value B2C transactions

BY JAIKUMAR VIJAYAN

Mortgage veodor Quicken Loans Inc. is deploying what may be the first electronic signature network for high-value business-to-consumer transactions.

Starting this spring, the Livonia, Mich.-based company will let loan seekers use electronic signatures to complete and submit mortgage applications immediately after being preapproved online, without requiring the usual paperwork and ink signatures.

Unlike emerging efforts to implement electronic signatures io other consumer settings, Quicken's loan process won't require consumers to use private keys, download digital certificates or ose specialized signing software to authenticate themselves.

Instead, the company will combine information provided by the consumer during the loan application process with a unique user name and information such as details of an auto loan to authenticate users.

"We are trying to make applying for mortgages as easy as applying for a credit card," said Kevin McCallum, the Quicken systems architect in charge of the electronic signature implementation. Quicken is a wholly owned subsidiary of Mountain View, Calif.-based Intuit Inc.

Quicken's effort shows that some corporations may finally be working through the technical, regulatory and legal concerns related to the use of electronic signatures in high-value consumer transactions, said Avivah Litan, an analyst at Stamford, Conn.-based Gartner Inc. "As far as I know, Quicken Loans is the first application to implement e-signatures in high-value B2C transactions," she said.

Though the E-Sign law was passed in 2000, adoption of electronic signatures has been slow because of uncertainty surrounding technology standards, authenticatioo methods and federal and state consumer protection requirements.

Quicken is depending oo a server-based electronic signature software package called ApproveIt from Mootreal-based Silanis Technology Inc. to address these issues.

ApproveIt captures, time-stamps and records what the borrower sees, clicks on, agrees to and electronically signs. The information is securely bound to the final digital loan documents as proof that the borrower's intent was captured in accordance with all applicable regulations, said Tommy Petrogiannis, president of Silanis.

However, there is no telling how such electronically signed documents might fare if challenged in court, said McCallum. "Right now, it is hard to say because there is no case precedent," be said.

AT A GLANCE

Cybersigning

The important distinction between digitol signatures and electronic signatures:

DIGITAL SIGNATURE: A cryptographic algorithm that secures and verifies the origin and integrity of digitally stored data.

ELECTRONIC SIGNATURE: A legal concept defined by the E-Sign law as a sound, symbol or process that's permanently attached to a legal record in such a way that it demonstrates a person's intent to sign.

SOURCE: SILANIS TECHNOLOGY INC., MONTREAL

NTT/VERIO

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* A full service offering may not be available in some areas.

BRIEFS

AT&T, Accenture Ink $2.6B Services Deal

AT&T Corp. handed off responsibility for managing new technology development at its long-distance sales and customer service operations to Hamilton, Bermuda-based Accenture Ltd. In a five-year deal valued at $2.6 billion. The companies said Accenture will lead the rollout of interactive voice response, Web and customer relationship management technologies at the AT&T unit.

Morgan Stanley Cuts IT Jobs, Projects

New York-based financial services firm Morgan Stanley Dean Witter & Co. said it laid off 120 IT workers as part of a cost-cutting program that includes the postponement or cancellation of unspecified technology projects. About two-thirds of the affected employees worked in North America, said Morgan Stanley, which wouldn't release further details on the cutbacks.

Exodus Asset Sale Approved by Judge

A U.S. Bankruptcy Court judge in Delaware approved Exodus Communications Inc.'s plan to sell most of its Web hosting assets to London-based Cable & Wireless PLC. The sale of U.S. operations covered by the deal is expected to be completed late this month or early next month, said Santa Clara, Calif.-based Exodus. The agreement includes Exodus' customer contracts.

Short Takes

The Washington-based FEDERAL COMPUTER INCIDENT RESPONSE CENTER said it received 88 reports of root-level system compromises from U.S. government agencies and departments last year, down from 155 in 2000. . . . HEWLETT-PACKARD CO. said it plans to outsource more of its PC manufacturing in order to cut operating costs.

Straight-Through Trade Processing Pressures IT

Lack of standardization is holding up compliance, conference attendees say

BY LUCAS MEARIAN
NEW YORK

MORE THAN half of the IT and business managers who attended a Wall Street conference on straight-through trade processing last week said they haven't begun upgrading their organizations' IT infrastructure and business rules in order to reach straight-through processing goals.

The target date to meet those requirements is still more than three years away because it was postponed by two years following the Sept. 11 attacks. It's expected to take at least a year for firms to amend their business rules, integrate their systems and adopt standards to meet the stricter terms and time constraints for clearing and settling financial transactions within a 24-hour window, experts say.

Shaw Lively, an analyst at IDC Corp. in Framingham, Mass., said it can take as long to test a straight-through processing (STP) system as it does to build one. Even without the planning phase, a straight-through processing project can take more than a year to complete, he said. "It's not just about assembling the components. There's a lot of vendors who have built various systems, but you still need to integrate those systems with yours."

The reason behind the slow rate of compliance? "There's a lack of market standardization in products, technology and operating platforms," said James Lafaman, managing director of New York-based Morgan Stanley Dean Witter & Co. Lafaman was one of the 1,000-plus attendees at the Securities Industry Association's (SIA) STP/T+1 conference here.

Lafaman's concerns were echoed by others at the conference who feel the industry needs to come up with a best practices model for disseminating trade information.

Artbur Thomas, chairman of the SIA's T+1 Steering Committee and chief operating officer at Merrill Lynch & Co. in New York, said financial services firms should have already assessed the cost and technology needed for straight-through processing and T+1, or trade-plus-one-day clearing.

Still Evaluating Options

A survey of 113 financial services firms at the conference revealed that 41% are still evaluating how to move to straight-through processing and T+1. Almost 10% of those companies said they haven't even started to evaluate their systems, 3% reported they are in the planning stages, and just 13% said they have started modifying their back-end systems and business rules. Meanwhile, only 1% said they are currently testing their straight-through processing systems.

"For T+1, matching trades is the largest gap we have to cross," said Thomas.

Tom McGahey, a consultant with Atlanta-based Wachovia Corporate Services Inc.'s STP/T+1 program, said Wachovia Corp. has already set up a communications network between IT departments and their respective business units to smooth the transition. "You have to understand that the business requirements must come first, and then you build the technology to support that," McGahey said.

Donald Donahue, managing director for the customer marketing and development group at the New York-based Depository Trust & Clearing Corp., said his firm plans to release a white paper in the next week that will propose industry changes needed for straight-through processing, such as a centralized trade settlement system and an industrywide communications network.

"Straight-through processing is an issue that affects all processes in the industry," Donahue said.

The Trade-Matching Dance

NEW YORK

The deployment of so-called virtual trade-matching utilities would be key to speeding trade settlements.

A virtual trade-matching utility is software that would use a virtual private network to verify all aspects of a trade and ensure that all parties agree on the terms.

The Global Straight Through Processing Association (GSTPA), an industry consortium, and Omgeo LLC, which is jointly owned by the Depository Trust & Clearing Corp. and Boston-based Thomson Financial, are finishing work on trade-matching utilities for real-time, post-trade processing. The GSTPA expects its trade-matching systems to go live by June, while Omgeo expects to be working on its system over the next two to three years.

However, even when those trading platforms are ready to go live, individual securities firms must still have robust back-end systems and business rules to handle straight-through processing of trades, including a common messaging platform and an integrated systems network.

Some industry practitioners voiced concern over potential conflicts between the two groups vying to build trade-matching engines. But Fritz McCormick, an analyst at Celent Communications LLC in Cambridge, Mass., said competition would help to develop the most viable system.

Others at the STP/T+1 conference here said they're worried that a virtual matching utility wouldn't meet Securities and Exchange Commission (SEC) rules for notification of all participants of a trade, which is currently done through paper certificates.

SEC Rule 10b-10 under the Securities Exchange Act of 1934 requires brokers and dealers to provide customers immediate written notification of information relevant to their securities transactions.

"An electronic confirmation satisfies 10b-10 if information referred to by 10b-10 is distributed to everyone in the transaction," said Larry Bergmann, senior associate director of market regulation at the SEC in Washington.

Bergmann also put to rest the notion that two trade-matching utilities wouldn't share information. After more than one matching engine is set up, the others "must get together and work out interoperability," he said. "If they can't in 60 days," they would be forced into arbitration, he added.

– Lucas Mearian

T+1 and Counting

Last week, Chicago-based Andersen and the SIA polled 113 brokerages about their STP/T+1 plans. Here's a sampling of the results:

22% said they would spend less than $500,000 to achieve straight-through processing (STP), and another 22% said they would spend between $500,000 and $3 million.

50% said 10% or less of their total development budget is allocated to STP/T+1 this year.

57% said they had not considered using outside vendors for STP/T+1.

90% said they would complete there business rules and IT systems upgrades for STP/T+1 by the SIA's June 2006 target date; 30% said they would complete it by December 2003. Only 5% said they would miss the target date.

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Retail CEOs Hold the Line on Tech Spending

Few say their companies plan to undertake major new systems initiatives

BY CAROL SLIWA
NEW YORK

RETAILERS may not be penciling in hefty increases to their IT budgets this year, but they won't be doing any mad slashing either.

Most CEOs interviewed last week at the National Retail Federation's annual conference here said they will either keep IT spending as budgeted or cut it slightly. Few, however, indicated that they would be taking on major new systems initiatives.

"We've got to watch [IT spending] carefully. It will not increase," said Leonard Riggio, CEO of Barnes & Noble Inc. in New York. "My druthers are that we would definitely cut back a bit."

Retailers "can't sit on [their] hands" with technology, Riggio said, but they must be cautious with major initiatives, especially in these times of economic uncertainty. "That's the thing about technology. You've always got a million things to do that you can't get to," he said. "And we have such a list. It goes on and on."

Pushing Ahead

Some retail CEOs said their firms will continue working on big projects that are already under way, including installations of major merchandising, warehouse and inventory management packages, and point-of-sale systems. Also, some said they will focus on trying to get more out of the systems they already have.

"How much technology do you really need to run your business?" said Mark Bozek, CEO of St. Petersburg, Fla.-based HSN LP, a subsidiary of USA Networks Inc. He said he would rather focus on having better products to sell over the company's Home Shopping Network and producing more entertainment shows. "I'll do much better doing that than I will this year investing on IT," he said.

But Bozek said he can't cut IT spending dramatically. He said HSN will scale back only slightly on the $35 million to $40 million it spent last year and focus on upgrading and implementing some of the major systems it bought over the past few years. Those include order, warehouse and inventory management systems.

However, Bozek said he believes that a company can slow down its product upgrades.

"The [technology vendor] world loves to create these sorts of ridiculously expensive upgrades that they build into the purchase price of it," he said. "You buy it one minute, and then next year [you say], 'Oh, we've got to upgrade,' and there's another $20 million."

David Suliteanu, CEO of San Francisco-based Sephora USA LLC, said his firm invested a substantial amount of money in its first two years to get a stable IT platform. But this year, he said, IT will be a "maintain expense."

Suliteanu said his decision is based more on business priorities than on the economic downturn. Suliteanu noted that the beauty products industry tends to be "recession-proof" and does well in tough times.

> How much technology do you really need to run your business?
>
> MARK BOZEK, CEO, HOME SHOPPING NETWORK

Most CEOs don't find themselves in that situation, however, and some said they will press forward on crucial IT projects despite the economy.

Terry Lundgren, president and chief merchandising officer of Cincinnati-based Federated Department Stores Inc., which includes Macy's and Bloomingdale's, said his company will invest in a new merchandising system and continue work on a marketing system project that began last year.

"This [systems work] is actually going to help us, not hurt us," Lundgren said.

George Jooes, president and CEO of Saks Inc.'s Department Store Group in Birmingham, Ala., said that this year will be significant for IT as the company moves toward common systems across its four operating divisions.

Jones said it's a project of such importance that it will receive "primary dedication" of the firm's resources. Although there's no breakthrough technology involved, the company expects to benefit substantially by gaining the ability to micromarket by store and giving its merchants new planning and allocation tools, be said.

Meanwhile, Hudson Bay Co. will forge onward with a five-year IT legacy systems overhaul that started three and a half years ago, also with the full support of its CEO. "IT comes to the head of the line because it is the one part of the strategy that has an effect on every single part of the business," said George Heller, CEO of the Toronto-based company.

Heller said a company can continue to fall behind and be forced to take increasingly greater risks if it doesn't stay current with IT developments to help run the business.

"Retail has gotten far more scientific than it was in the past," be said, recalling the days wheo "you had buyers who had a good nose for this or that. Today, it is about efficiency ... decision support ... inventory control."

Retail CIOs Focus on High-Priority Projects, Cutting Costs

Tightened purse strings are forcing many retail CIOs to focus on high-priority IT projects, as they stay on the lookout for creative ways to cut costs to help pay for those projects.

Retailers attending last week's National Retail Federation annual conference talked about completing projects they started in prior years, getting more return from the systems they have in place and launching only those new initiatives that are critical to the business.

"We've gotten very rigorous about the projects that we're doing. And we're looking to make sure that we're being fully efficient on the processing side," said Ken Harris, CIO at San Francisco-based The Gap Inc. Harris said his company has considered moving some project timelines.

High-priority projects cited by retail CIOs ranged from the installation of merchandising, inventory management and point-of-sale systems to the unification of disparate customer databases. To pay for those initiatives, some retailers said they would postpone low-priority projects, seek out projects with a quick return on investment and look for ways to cut costs.

Judith Formichella, vice president of IT at New York-based Polo Ralph Lauren Corp., said her CEO told all departments to cut expenses by 5%, and she thinks she can do better.

Formichella said she will try to renegotiate software maintenance contracts and put the savings toward new capital projects. Top priorities will be supply chain and inventory management, completion of a point-of-sale rollout and moving Polo to common systems on a global basis, Formichella said.

Evelyn Follit, senior vice president and CIO at RadioShack Corp., said the Fort Worth, Texas-based retailer plans to continue to use offshore programmers to develop code, emphasize training for U.S.-based staffers "in this time of low turnover" and revisit vendor contracts to make sure her company is realizing the "correct value from the agreement."

Those efforts should help Follit's IT department take on a new project to improve the analytics that enable RadioShack to optimize pricing and other business functions. Follit said her company also will focus on supply chain improvements.

Philip Maxwell, senior vice president and CIO at The Neiman Marcus Group Inc., said the Dallas-based luxury retailer had a large IT budget increase planned. Instead, the budget will stay relatively flat. Priorities include unifying the company's approximately 20 customer databases and creating a gift registry, with both projects expected to generate new sales.

Replacing Neiman Marcus' aging point-of-sale systems, by contrast, won't bring a good return on investment, Maxwell said.

"If the system is eight or 10 years old, you have to go do something about it," he said. "Some way as we move into financial systems. There won't be a good ROI on it, but it's the basis to do some other things that we want to do afterward."

– Carol Sliwa

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BRIEFS

Gates: Microsoft Must Focus on Security

Bill Gates, Microsoft Corp.'s chairman and chief software architect, issued an internal memo stating that "trustworthy computing" should be the company's highest priority. "When we face a choice between adding features and resolving security issues, we need to choose security," Gates wrote. Meanwhile, Microsoft said it fixed a faulty server that kept Windows XP users from downloading software patches.

Revenue Up, Profits Down at Microsoft

Microsoft announced that revenue in its second quarter ended Dec. 31 amounted to $7.7 billion, up 18% from the year-earlier level of $6.6 billion. But the company's second-quarter net income fell 12% year to year, from $2.6 billion to $2.3 billion. The latest results included a $660 million charge related to a proposed settlement of class-action lawsuits over Microsoft's pricing.

IBM Reports Drop in Q4 Sales, Income

IBM reported its second straight down quarter, with net income for the fourth quarter at $2.3 billion – off 13% from the same period in 2000. Fourth-quarter revenue declined 11% year to year to $22.8 billion, which IBM partly attributed to weak PC sales. But mainframe revenue for the year as a whole was up for the first time since 1999.

Hackers Targeting Sun Systems, CERT Warns

The CERT Coordination Center at Carnegie Mellon University in Pittsburgh warned that hackers are actively trying to break into Sun Microsystems Inc. hardware left unprotected against a well-known security hole that affects the user interfaces in various versions of Unix.

Utility Companies Face Barrage of Cyberattacks

Outsourcing program offers a potential means of developing better tactical defenses

BY DAN VERTON

MANY OF THE nation's utility companies are finding it increasingly difficult to keep up with the number of cybersecurity incidents involving their control systems.

Determining what to do about that problem was a key topic addressed at a utilities conference last week in New Orleans. The conference, sponsored by the American Gas Association (AGA) and the Edison Electric Institute (EEI), included a panel of experts who discussed the security challenges utility companies face as they deploy greater numbers of commercial IT systems throughout what is arguably one of the most critical sectors of the U.S. infrastructure.

Information Overload

Companies that belong to the AGA or the EEI, both of which are based in Washington, account for all of the natural gas used by businesses in every state and 75% of all the electricity generated in the U.S.

A large utility "could have a millioo [intrusion] events that need to be analyzed," said Will Evans, vice president of IT services at People's Energy Corp., a Chicago-based AGA member company that serves about 1 millioo customers in Chicago and northeastern Illioois. "I don't think anybody has the capability to do that in-house. It's practically impossible."

According to Alexandria, Va.-based security firm Riptech Inc., the large number of intrusions is particularly disturbing giveo the nature of the nation's Supervisory Control and Data Acquisition (SCADA) systems, which are used to manage the flow of electricity.

In a white paper prepared by Riptech in January 2001, the company detailed how the power industry's demand for remote access has encouraged many utility firms to establish connections to SCADA systems. In addition, some utilities have added connections between corporate networks and SCADA networks in order to allow executives to obtain instant access to data about the status of their operational systems, according to Riptech.

"The security strategy for utility corporate network infrastructures rarely accounts for the fact that access to these systems might allow unauthorized access and control of SCADA systems," the white paper concluded.

Outsourcing Option

To address the problem, Riptech developed a four-pronged outsourcing program.

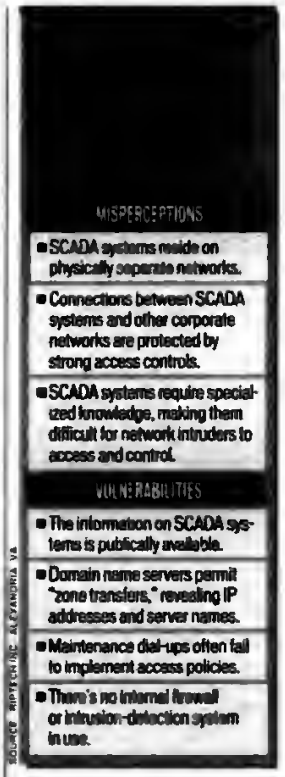
The company announced last week that it will offer preferential pricing treatment to all AGA and EEI member companies that require round-the-clock network monitoring, security assessments focused on the unique industrial control systems used by the industry, and secure architecture design, in addition to a secure gateway through which utilities can feed tactical intrusion information into the energy sector's Information Sharing and Analysis Center.

The services are based on requirements spelled out by a council of utility company CIOs, said Tim Belcher, Riptech's chief technology officer.

Evans characterized the program, particularly the secure tactical information sharing effort, as an important step for the utility industry. Executives from the AGA and EEI have been evaluating vendors for such services since before the Sept. 11 terrorist attacks, which highlighted the vulnerability and importance of the nation's critical infrastructure, Evans said.

Joe Weiss, technical manager of the Enterprise Infrastructure Security Program at the Electric Power Researeh Institute in Palo Alto, Calif., said he's encouraged by the Riptech offer. But he added that he remains concerned that the industrial sector as a whole hasn't yet addressed the fundamental cybersecurity challenges stemming from its use of legacy control systems.

"Firewalls and intrusion-detection systems have been designed to protect against known IT exploits," said Weiss. "That has nothing to do with industrial control systems."



Vulnerability Assessment Triggers Alarms

Data collected on cyberattacks during the past six months by a security firm that monitors corporate networks throughout the world shows that companies in the energy industry suffer attacks at twice the rate of other industries. And many of those attacks appear to be sponsored by governments or organizations in the Middle East.

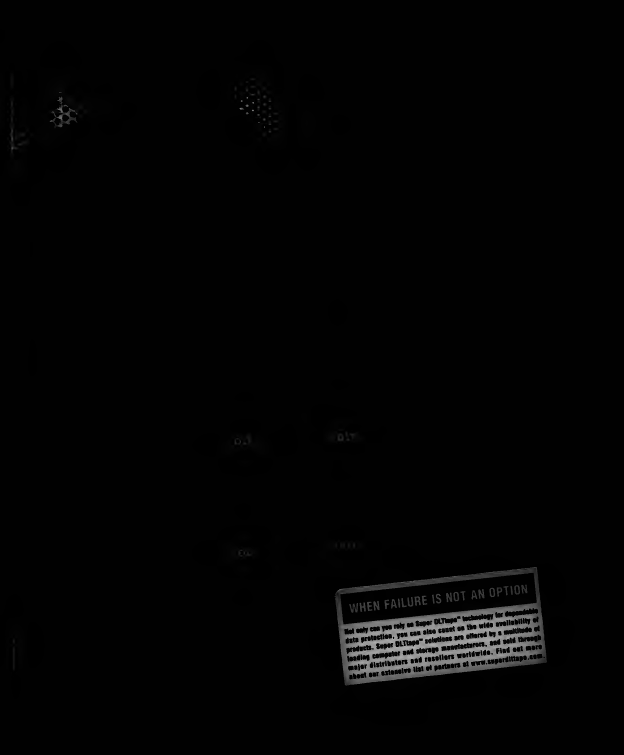
A recent threat assessment conducted by security firm Riptech studied more than 5.5 billion firewall logs and intrusion-detection system alerts. Of the approximately 129,000 validated cyberattacks uncovered, power and energy companies averaged 12.5 severe or critical attacks requiring immediate intervention per company. That rate is more than twice the average rate of attacks for all 300 companies surveyed, according to Tim Belcher, Riptech's CTO.

In addition, Belcher said he has uncovered evidence that the average number of attacks originating from the Middle East is nearly twice as high per utility company as for companies in the high-tech, media and financial services industries.

"For the first time, this provides empirical evidence that critical infrastructures do have profiles of attacks that appear to be sponsored by governments or other organizations in what we would consider to be threat countries," said Belcher.

Belcher's statements come on the heels of an internal law-enforcement warning issued Jan. 16 by the FBI's National Infrastructure Protection Center about potential Internet-based attacks targeting utilities and municipal and state government information systems.

– *Dan Verton*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Continued from page 1

Airlines

difficult in just two months — and impossible in two days, industry experts agreed.

Without qualifying the statement, Mineta said in his speech that "on originating flights, baggage will be matched to its passenger." When asked the next day for clarification, Hank Price, a spokesman for the newly formed Transportation Security Administration (TSA), an agency of the DOT, stated explicitly that bag matching would be required on 100% of originating flights — as opposed to connecting flights — with all bags matched to passengers.

Yet at the same time, Rebecca Trexler, a spokeswoman for the Federal Aviation Administration — also an agency of the DOT — said bag matching was "required on all originating flights, but not necessarily for every bag."

When asked in a telephone interview to clarify the contradiction, Paul Takemoto, another TSA spokesman, said, "I don't want to get into the fray," and hung up.

Sheer Confusion

To further complicate matters, DOT spokesman Bill Mosley on Jan. 17 at first said all bags would indeed have to be matched to passengers on all originating flights. But he later recanted. "I retract what I said. The FAA was correct," Mosley said. "We are not matching every bag. For security reasons, we are not disclosing what percentage [will go through bag matching]." Mosley said that he, other DOT spokesmen and Mineta had been relying upon old information.

That the agencies overseeing the implementation of the guidelines were so confused was unsettling to the airlines, which have been working on compliance plans for months.

MORE ONLINE The full text of Mineta's speech to the Transportation Research Board can be found at www.dot.gov/affairs/011602sp.htm

The Aviation and Transportation Security Act, passed by Congress in November, stipulated that airlines could meet the new security guidelines by demonstrating the use of one of four kinds of baggage-screening procedures: explosives-detection systems, K-9 bomb-sniffing teams, hand searches or bag matching. Bag matching assures that every bag in the cargo hold belongs to a passenger who has boarded the plane. But Mineta's statement appeared to indicate that bag matching would be a requirement, not an option.

Officials at American Airlines Inc., United Air Lines Inc., Northwest Airlines Corp., Southwest Airlines Co. and Alaska Airlines Inc. all said on Jan. 17 that they had no indication from their contacts at the

THE ASSOCIATED PRESS

DOT, TSA and FAA that the requirements had changed, and they weren't modifying their compliance plans, despite Mineta's statement. "The industry would have been in a panic" otherwise, said one airline spokeswoman.

Most airlines made vague announcements indicating that they would be able to meet the Friday deadline.

Separately, American Airlines in Fort Worth, Texas, said in a statement that it had made changes to its computer check-in system "to prevent situations in which bags are boarded but the owners of the bags are not. American Airlines tested the procedures at multiple airports to refine them, and everything was coordinated with the DOT."

American said it wasn't relying upon wireless networks to implement the bag-matching procedures in order to comply with the Friday deadline. Widely acknowledged security problems with wireless networks were a major cause of concern as the deadline approached [Page One, Jan. 14].

Reporter Bob Brewin contributed to this report.

MORE THIS ISSUE

Nextel's spectrum plans may affect wireless users — and bag matching. **See page 8.**

GM Drives Application Development Offshore

Automaker uses programmers in India for the first time to speed up Web project

BY LEE COPELAND

GENERAL MOTORS Corp. last week launched its latest Web-based applicatioo for car owners, marking the first time it has relied on an offshore organization for a big application development project.

In doing so, the automaker joined a growing list of companies turning to offshore development as a means to quickly complete complex projects. GM credits this approach with building the application in six months and at substantial cost savings over using U.S.-based consultants, said Stu Dressler, global program manager of Owner Center at GM.

Owner Center is a Java-based Web application that allows registered GM vehicle owners to track warranty, recall and service information online. It was built with BEA Systems Inc.'s WebLogic application server, Art Technology Group Inc.'s personalizatioo server and a Web server from iPlanet E-Commerce Solutions, an alliance of Sun Microsystems Inc. and AOL Time Warner Inc.

Teaneck, N.J.-based Cognizant Technology Solutions Corp. led the project for GM. Two to four project leaders working at GM's Detroit headquarters managed a team of about 25 developers in Bangalore, India, Dressler said.

Project Tips

To keep offshore development projects on track and on budget, users suggest the following:

ENLIST technical leads and systems architects at the end-user company to manage the development project.

REQUIRE the offshore organization to provide an on-site liaison to bridge cultural and communication gaps.

THINK ahead to the project's end and make sure that you retain or train internal staffers to maintain the application.

Many companies outsource IT services to manage costs during economic downturns. But the complexities of these relationships, particularly with offshore vendors, require strong project management on the user's part, said Mike Dodd, an analyst at Giga Information Group Inc. in Cambridge, Mass.

"Wheo done properly, [offshore developmeot] cao achieve cost-cutting goals, but it's not a silver bullet," he said. "It's like a marriage: If you rush in with haste, it won't work."

Caterpillar Financial Services Corp. has also tackled that challenge. The Nashville-based financial wing of Caterpillar Inc. launched a Web-based financial system at year's end — a multimillion-dollar project that took three years to build and utilized offshore developers in India, with project leaders in Chicago, said Tom DePauw, manager of IT at Caterpillar Financial.

To manage the development process and ensure that Caterpillar could maintain the application, DePauw hired applicatioo architects and trained employees already on staff in enterprise Java and project management skills. "We grew our support team internally to match the project," he said.

Having an on-site liaisoo to manage offshore development projects is another key component of success. Chicago-based ThoughtWorks Inc. played that role for Caterpillar Financial, and Cognizant Technology served as the liaison for GM.

That kind of link between U.S. and offshore developers is critical, said Evelyn Follit, CIO at RadioShack Corp. in Fort Worth, Texas.

The electronics retailer is developing new applications using India-based developers managed through Cognizant. Follit said an on-site liaison can bring in additional cost savings by ensuring that code is reliable and meets quality benchmarks.

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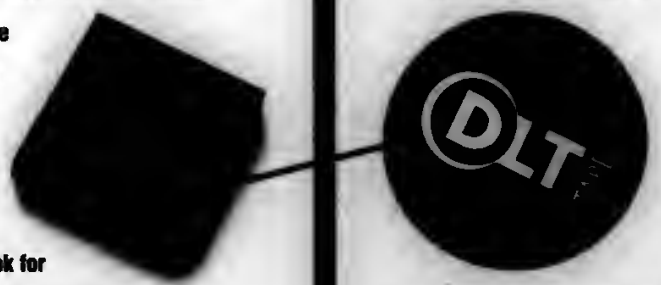

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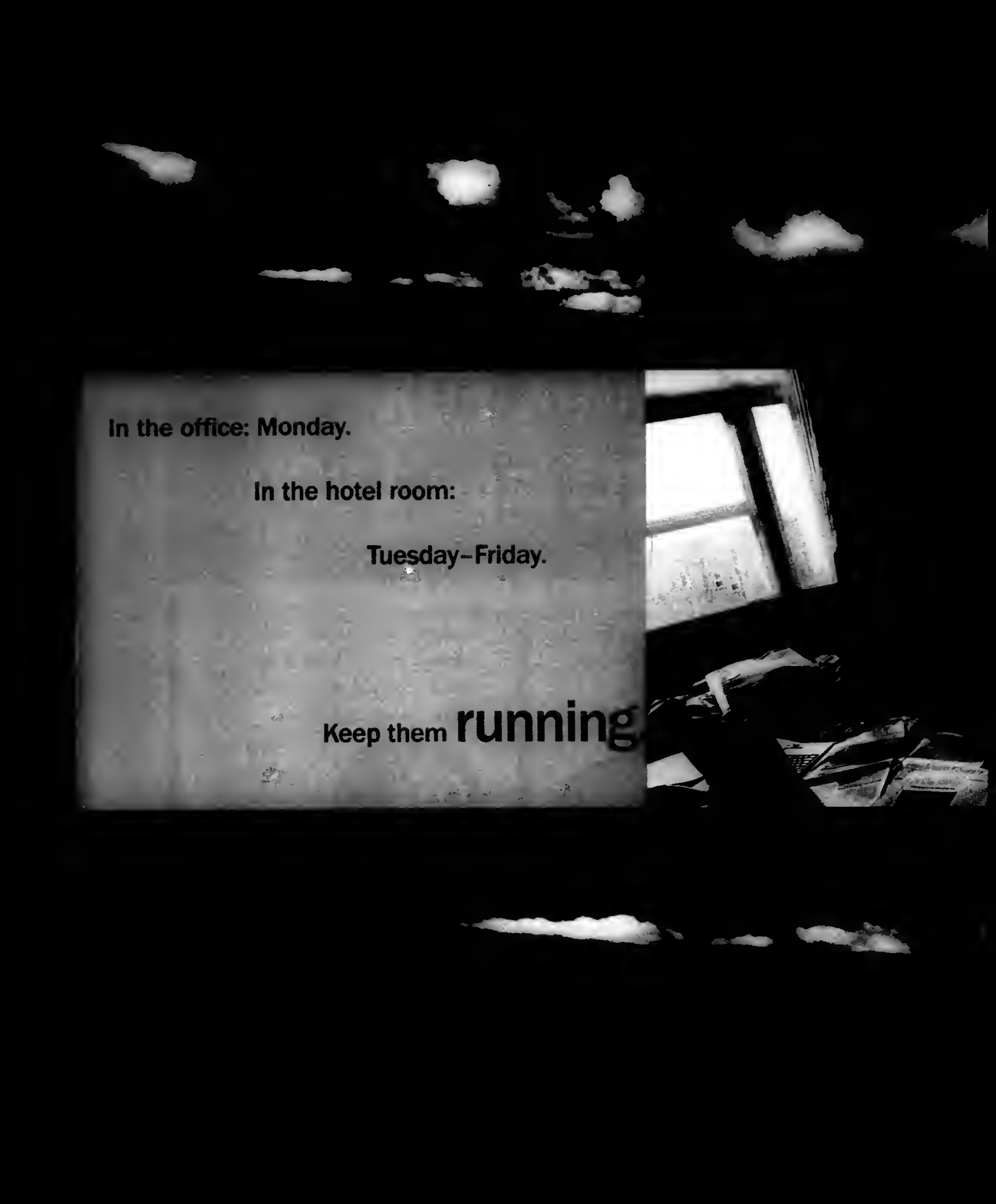
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Report: U.S. Businesses Skimp on Cyberattack Protections

BY LINDA ROSENCRANCE

U.S. companies aren't doing enough to protect their IT systems from the threat of cyberattacks, according to a report released this month by the Computer Science and Telecommunications Board (CSTB).

The CSTB, a part of the National Academy of Sciences in Washington, also said software and computer vendors should be held liable for system breaches if they don't drastically improve the security of their products. But the panel's report asserted that many corporate users "tend to underinvest" in IT security measures.

In the report, a synthesis of information contained in National Research Council reports over the past 10 years, the CSTB said, "From an operational standpoint, cybersecurity today is far worse than what known best practices can provide. Even without any new security technologies, much better security would be possible if technology producers, operators of critical systems and users took appropriate steps."

Many companies don't implement the necessary level of security because that can be expensive, the report said. The CTSB also acknowledged that payback is uncertain "because serious cyberattacks are rare." But shortchanging security could be catastrophic for companies, warned the CSTB, which provides advice to the U.S. government on technical and public policy issues related to IT.

Investment Options

Eric Hemmendinger, an analyst at Aberdeen Group Inc. in Boston, said the concerns raised by the CSTB aren't entirely new. But he said he agrees that many users still aren't doing enough to protect themselves from cyberattacks.

"Companies are more concerned with risk management than with risk elimination," Hemmendinger said, adding that IT managers need to "determine what their comfort zone is" when deciding how much to invest on security.

Some IT managers elect not to do more to protect their systems because such investments would consume money and personnel that are needed for other technology projects, said Pete Lindstrom, an analyst at Hurwitz Group Inc. in Framingham, Mass. "It's hard, tedious work, and not everyone is willing to put in the effort," Lindstrom said. "It's easier to pay lip service to security."

As a result, he added, security considerations often take a backseat when companies set plans for developing and managing their IT installations.

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BRIEFS

Intel Names President; Q4 Income Declines

Intel Corp. reported net income of $504 million for the fourth quarter of 2001, down 77% from $2.2 billion in the same period of 2000. Fourth-quarter revenue fell 20% year-to-year, from $8.7 billion to $7 billion. Intel also named Paul Otellini its president and chief operating officer. Otellini had been managing Intel's microprocessor and chip-set businesses since 1998.

Oracle Signs Two Acquisition Deals

Oracle Corp. has acquired the technology assets of Indicast Corp., a San Diego-based developer of voice-enabled Internet software. Oracle also announced that it has agreed to buy NetForce Inc., a San Francisco-based vendor of software used by pharmaceutical companies to track information about the safety of drugs. The financial terms of the two deals weren't disclosed.

3Com Decentralizes, Makes More Cuts

Santa Clara, Calif.-based 3Com Corp. laid off 500 more employees, cutting its 5,900-person workforce by 8%. The struggling networking vendor also said it's transferring responsibility for marketing, human resources and financial data analysis from the corporate level to its three operating units. Accounting and internal IT functions will continue to be managed centrally.

Short Takes

Keeping in line with a prediction made two weeks ago, COMPAQ COMPUTER CORP. reported a fourth-quarter profit of $92 million on revenue of $8.5 billion. . . . Rosemont, Ill.-based COMDISCO INC. agreed to sell two of its product leasing businesses to GENERAL ELECTRIC CO.'s GE CAPITAL CORP. financing unit in Stamford, Conn.

SAP, Commerce One Scale Back Sales Deal

Vendors end online procurement software partnership, keep B2B marketplace effort

BY MICHAEL MEEHAN

SAP AG AND Commerce One Inc. last week disclosed plans to go their separate ways in the online procurement software market. But the two companies said that doesn't mean their 18-month-old sales partnership is being dropped altogether.

The divide involves a deal under which SAP and Pleasanton, Calif.-based Commerce One agreed to sell each other's online procurement software in a combined offering called Enterprise Buyer. SAP officials said the two vendors' sales were targeting the same customers, many of whom are among SAP's installed base of business application users.

Still in place, though, is an agreement related to business-to-business marketplace software. Gary Fromer, chief strategy officer at the SAP Markets Inc. subsidiary in Palo Alto, Calif., and Commerce One CEO Mark Hoffman said the partners will continue to develop and sell their combined MarketSet technology, which has about 40 users.

SAP injected $250 million into the struggling e-commerce software vendor last year and now owns 20% of Commerce One's stock. In addition, Commerce One has become increasingly dependent on SAP for business: Half of Commerce One's software license sales now occur within SAP's customer base, said Karen Peterson, an analyst at Gartner Inc. in Stamford, Conn.

Even so, the parting of the ways regarding online procurement software wasn't a big surprise, Peterson said.

The deal with Commerce One gave SAP "the ability to associate [itself] with someone who had competence in online commerce" at a time when SAP lacked its own technology, she noted. But SAP has developed its own procurement product line, capped off by a set of supplier relationship management tools that were announced two weeks ago.

Fromer said the joint procurement efforts were hindering the penetration of that software by limiting the ability of the companies to target users who only wanted one of the two pieces. "Now we don't have to approach customers as a package deal," he said.

As part of the procurement split, SAP will take back the rights to Enterprise Buyer Professional Edition, which automates the procurement of materials and services that go directly into goods sold by companies. That software also provides a central control point for buying standard commodities such as office supplies.

Commerce One will retain ownership of Enterprise Buyer Desktop Edition, a lower-end application that was designed to give individual employees and departments the ability to buy goods electronically. ▶

Reporter Marc L. Songini contributed to this report.

A Changed Approach

SAP and Commerce One first teamed up in mid-2000. This is where their deal now stands:

ON: Joint development and sales of online marketplace software. SAP has also built Commerce One technology into its Web-based mySAP Technology architecture.

OFF: Sales by each company of a combined package of online procurement software. Instead, SAP and Commerce One will sell their own products separately.

Baan Reorganizes, Looks To Make Fresh Start in CRM

Upgrade aimed at boosting demand

BY MARC L. SONGINI

Baan Co. last week moved to revive its line of customer relationship management (CRM) software, announcing a rebranded and upgraded release that will be marketed as part of an integrated suite of Web-enabled enterprise applications.

Netherlands-based Baan said iBaan for CRM will let departments within a company seamlessly share customer data. The rollout adds new data-analysis and product configuration tools and formally reverses a 13-month-old plan under which parent company Invensys PLC shifted the CRM line from Baan to a new unit in Golden, Colo.

Analysts said the reorganization and the addition of Web support to iBaan for CRM could help Baan compensate for sales opportunities that it lost because of muddled marketing and its CRM software's lack of integration with the company's other products.

The product line stalled after it was split off from Baan, said Kelly Spang, an analyst at Current Analysis Inc. in Sterling, Va. Moreover, she said, London-based Invensys initially didn't give the CRM operation enough resources or manpower. Sales "just kind of dropped off from there," Spang said. "It might have cost Baan a year in the CRM market."

Sharon Ward, an analyst at Hurwitz Group Inc. in Framingham, Mass., said Baan has had trouble linking its CRM and enterprise resource planning (ERP) applications ever since it bought CRM vendor Aurum Software Inc. in 1997. But with the addition of iBaan for CRM, she said, Baan is now promising a fully integrated set of Web-enabled software.

"I don't expect [iBaan for CRM] to be competitive as a stand-alone product, at least at first," Ward said. "It will keep some customers who want an integrated solution from defecting [to rival vendors]."

For example, Baan ERP user A-dec Inc. plans to have finished rolling out iBaan for CRM's online sales module by March. But Keith Bearden, CIO at the Newberg, Ore.-based maker of dental equipment, said installing the software was "not as easy . . . as it was made to seem" by Baan. A-dec had hoped the application would be easy to install, he said. But the company had to bring in consultants to do coding work to link its business processes to the Web. ▶

AT A GLANCE

Going Back To the Future

Baan's announcement included the following details:

- The CRM software is **back under Baan's control**, reversing an earlier move that shifted it to a new unit within parent company Invensys.
- Baan said it's adding **Web front-end support**, a browser-based product configuration tool and expanded customer analysis capabilities.

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PATRICIA KEEFE

Airline Insecurity

IF EVER THERE WAS an opportunity for IT to step into the breach and demonstrate how technology can serve the needs of business — if not actually secure its future — it's the security crisis facing this country's system of air travel. The airline industry is in disarray, reeling from the one-two punch of a flailing economy and the Sept. 11 terrorist attacks. Piling on top of the already financially struggling airlines is a hastily enacted government mandate for costly new security measures.

Patricia Keefe is editorial director at Computerworld. You can contact her at patricia_keefe@computerworld.com.

Despite a $15 billion federal bailout, we're already seeing reports of sizable fourth-quarter losses — so far, from AMR Corp. (parent of American Airlines) and Continental Airlines.

It doesn't help that the airlines are practically starting from scratch. For years, the industry lobbied aggressively against any legislative efforts to force the installation of security measures, some already successfully in use in Europe.

Since the 1988 bombing of Pan Am Flight 103, it has taken more than 13 years to enact a bag-matching system in this country. One aviation industry executive told us that our report last week [Page One, Jan. 14] on insecure bag-matching systems "did not surprise him in the least" because "when you are losing that much money, you don't want to spend it on security."

But the airlines must. Our investigative report on the security of the wireless technology used today by airlines revealed serious flaws and a scattershot approach to addressing the issue. Exacerbating the situation is the lack of adequate funding or clear direction in the Aviation and Transportation Security Act about which technologies to use.

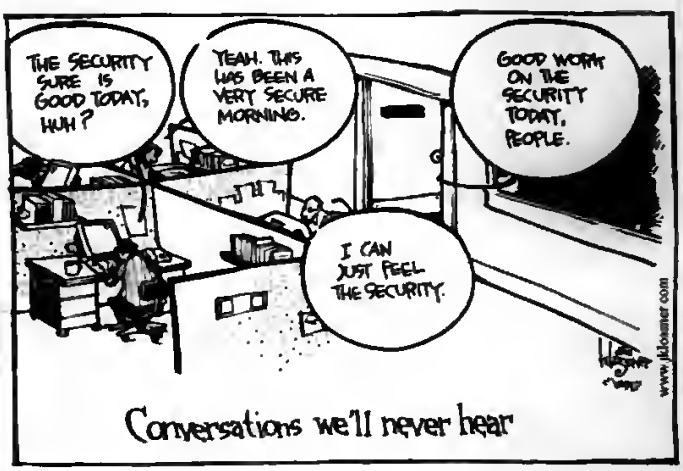
Meanwhile, analysts are warning that the airlines must woo back skittish travelers or face losses well into the billions. That effort won't be helped by the long delays triggered by multiple security checks and the utter stupidity of many of the procedures now in place.

It's a dicey situation. But it's no exaggeration to say that IT is just the ticket to save the airlines. You can do it by providing the leadership that has been lacking from your business peers:

- Band together as the airlines' top IT thinkers to speak with a more powerful, unified voice to the government and to request the revisions, extensions and funding that will be needed to meet the security mandate.
- Design systems that minimize the wasteful and ineffective random checks now holding up passengers, baggage and planes. "Profile" boarding passes to show when passengers have been searched or how many times they have left the gate. Offer trusted-passenger programs using biometrics to help diminish airport security gridlock.
- Save time and money by not reinventing the wheel. Europe and Israel are already testing or deploying leading-edge biometric technologies such as iris-scanning, and they already have much more secure wireless networks in place. Learn from Europe's mistakes; benefit from its successes.
- Agree on best practices and lobby strongly to influence and speed up the delivery of industry standards and technology offerings. As long as vendors continue to bicker and technology offerings fall short, some airlines will take a proprietary route, which could create information-exchange problems down the road.

Only by working together can airline IT shops restore consumer confidence and combat terrorism by creating a cohesive and secure approach to restoring our freedom of mobility.

The ball is in your hangar. ◗



Conversations we'll never hear

PIMM FOX

The Modern Profile of The IT Pro

DESPITE THE popular image represented in "Dilbert," IT professionals are likely to be multilingual, live and work in diverse cultures and eschew white shirts with pocket protectors for black turtlenecks worn on gym-toned bodies.

Unfortunately, the public's perception of the IT geek as a passive worker drone has done more harm to the industry's self-esteem than the collapse of IT budgets and technology stocks.

An antidote would be meeting Janelle Jimenez, 23, of Atlanta.

Pimm Fox is Computerworld's West Coast bureau chief. Contact him at pimm_fox@computerworld.com.

Her parents are from the Dominican Republic, she speaks three languages, and she grew up on Staten Island, N.Y. Returning from a visit to her fiancé in Rome, Jimenez spent the nine-hour flight studying for her Cisco Certified Network Administrator test and spoke articulately about her IT career. Jimenez likes the possibility of connecting different kinds of networks. "Every situation is different because every company is different," she says.

Listening to Jimenez, you'd never know IT was going through a meltdown. "I'm not in it for the money," she says. "I want the experience and opportunity to meet people and learn how businesses use IT." Her technical and language skills should make it possible for her to work in Italy next year.

Could this be the IT industry branded as narrow and uninteresting by the popular press?

According to Judy B. Homer, president and principal of an eponymous executive-level IT recruiting firm in New York, the short-sleeved, taped-glasses look might have defined the IT world in

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the 1970s, but the ranks are currently filled with men and women of diverse ethnic and cultural backgrounds.

Now, IT professionals possess the polish and sophistication typically associated with executive managers and customer representatives.

You can, in fact, easily mistake Anthony McCloude, 31, who oversees the LAN and peripherals for airlines at New York's John F. Kennedy International Airport, for an executive because of his poise and polish. The Englishman, who has lived in Brazil and speaks Portuguese, says upward mobility can be limited if you don't fit the management stereotype.

And there's evidence that fewer are fitting the Dilbert stereotype.

Gina Schiller, director of technology recruitment at J.B. Homer Associates, says IT pros now come with non-IT skills to augment their careers. For example, a legal background is useful for negotiating vendor contracts.

Don't buy into stereotypes of IT. Being well spoken, well groomed and well rounded can make the difference in your career. And it won't hurt the rest of your life either. ◗

DAN GILLMOR

Eight Ways to Get Ready for Mobile Usage

REMEMBER the guy in that meeting last week who seemed to be paying close attention to everything but kept glancing into his lap? He was probably doing e-mail on a BlackBerry or some other handheld device. Can you say "Annoying"?

If IT thought the PC brought major changes to the enterprise, just wait for wireless to take hold. From Wi-Fi (802.11b) to Bluetooth to new kinds of mobile telephony and data services, this is genuinely disruptive technology.

The U.S. is lagging behind Europe and some parts of Asia, where wireless has transformed businesses in small and large ways. But ultramobility is coming fast here, and companies need to be ready with some rules of this new data road. Here are eight observations and suggestions:

1. Think about security now, not later. Remind employees that they're talking on radios when they use mobile phones. Wi-Fi, which is springing up all over the U.S., has some fundamental security problems in its current incarnation. If you set up an 802.11 network on your premises, remember that you may be exposing your systems to people in your parking lot. Don't allow access to sensitive data except with a VPN or other serious encryption. Also, be sure to secure laptop computers so that when employees sign into a Wi-Fi network from a remote location, their data won't be open for inspection.

Dan Gillmor is technology columnist at the San Jose Mercury News. Contact him at dgillmor@mercurynews.com.

2. Don't give everyone a BlackBerry. These small devices are wonderful for some people, such as those who absolutely have to be online all the time. But they're relatively expensive. They're also addictive for some users, who are prone to sending e-mail in the middle of family dinners and other inopportune occasions.

3. With that in mind, persuade higher-ups to ban all wireless devices in meetings – and make the policy stick. If these gatherings are so boring that people feel the need to do e-mail on their BlackBerries, fix the meetings.

4. Think about how your Web site's information will look on the small screens of most wireless devices. Create mobile-oriented miniportals by essentially retrofitting existing data on your servers to supply key information for on-the-road employees and others who may want to look up data quickly on your site. Forget the graphics, and remember how efficient text can be.

5. Don't expect high-speed 3G mobility to arrive anytime soon. But do think about how your company can use that bandwidth when it does arrive.

6. Look hard at the new generation of devices, such as Handspring's newly launched Treo, a combination PDA/mobile phone. It's a natural match, and the convenience factor will be hard to beat. Again, however, make sure security is part of the system from the outset.

7. Want to learn new ways to use mobile devices? Ask your kids. The explosion in short messaging was launched, by many accounts, when teenagers in Finland figured out how to use the text-messaging systems to do more than tell phone owners they had new voice mail messages waiting. Now, Short Messaging Service is as popular as voice in some countries, and it's often more efficient and cost-effective.

8. Be prepared for new tech-support duties. This stuff is wonderful to use when it works right, but it doesn't always work. IT needs to hammer on the suppliers to make more reliable and simple products, for everyone's sake.

Mobile technology, like any technology, will be both a blessing and a curse. But if you want more of the blessings, plan ahead. ◗

READERS' LETTERS

Managing With Tact

BY BRINGING UP his concerns about a laptop security vulnerability in a meeting, Mathias Thurman put the operations manager on the spot, essentially challenging him ["Vulnerability Draws Yawn From Operations," Security Manager's Journal, Jan. 7]. I suspect that the problem could have been resolved more smoothly if Thurman had gone to the operations manager privately and worked to win him over — even make it the ops manager's idea to get the change made. And if he ran into resistance, he also needed to do a little probing to find out the true reason for it.

Some possibilities:

1. The ops manager is under fire for spending too much on laptop support or for deploying images that cause frequent problems.

2. The ops manager has been indulging in office gossip that security people are a bunch of meddlers, and he can't cooperate with Thurman without appearing foolish, at least in his own eyes.

3. The ops manager is a jerk and can't be counted on to cooperate in any case.

Thurman got the necessary change, but at the expense of future confrontational behavior.

Jordan C. Kelly
Senior engineer
Science Applications International Corp.
Dayton, Ohio
jordan.c.kelly@saic.com

Some Sites User-Hostile

BEYOND Patricia Keefe's complaint about sites that don't work the way their designers intended ["Santa's Little Hinderers," News Opinion, Jan. 7], how about designs that are user-hostile for no apparent reason? Many sites require you to enter phone and credit card numbers in a specific format (with parentheses, in groups of four, without spaces, etc.). However, the data processing program can strip out all of the nonnumeric characters. The database doesn't care what the user entered as long as the data is there.

I'm not asking for human-like intuition about what the user really means; I'm asking for the softwarelike ability to ignore what doesn't matter.

Richard C. Haven
Mountain View, Calif.
rhaven@hotjobs.com

I'd Rather Do It Myself

IF THE TECHNOLOGY described in "Anticiparallelism" [Future Watch, Jan. 7] comes to pass, it will provide yet another way for Microsoft to know what you want to do and to do it even if you don't want to. Outlook, which is the fastest virus spreader ever known, will now be able to predict that you really want to send that infected mail; after all, you did it last time.

Jesse I. Pollard
Systems administrator
Northrup Grumman Data Systems
Metairie, La.

ANTICIPARALLELISM might be a good idea, but how are we supposed to believe that anyone can get a software product to do so much extra when we can't get software to do what we want in the first place? If 99.5% of all JPEG files I receive in e-mail are filed in a folder called c:\funnies, how would the software know that I want a picture of my grandmother in a different folder? That's just an example of how the slow processor between your ears can't easily be mimicked. Spare processor time should be used to make the system perform better when I'm using it, not to guess at what I might want it to do next.

S. Zinn
Network engineer
Dallas

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KNOWLEDGE CENTER: ENTERPRISE NETWORKING

Cost-Conscious Nets

IT managers keep an eye on the bottom line as they deploy WAN technologies that promise lower costs.

EDITOR'S NOTE

I KNOW. You didn't get into the IT field to be a bean counter. But desperate (recessionary) times call for hauling out the green eyeshades.

If you're not taking a close look at your telecom bills — and monitoring your network traffic — you could be paying thousands of dollars for T1 lines that were supposed to be turned off, as well as for wasted bandwidth, unused services and overprovisioned circuits. It's also time to assert some control and centralize the procurement of telecom services, so those mavericks in the remote offices aren't signing up for high-cost network services or cellular plans.

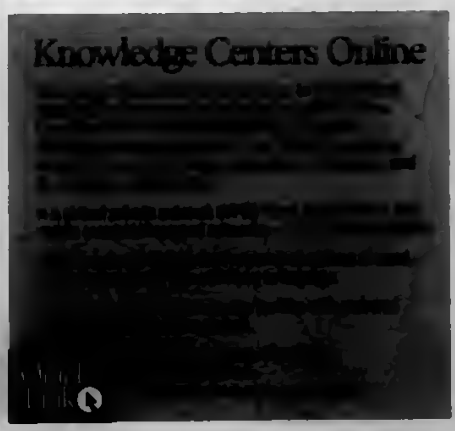
You also didn't get into IT to become a contract lawyer. But it's time to take another look at those networking contracts and negotiate better deals. The vendors are hungry.

Meanwhile, it's time to think creatively about penny-pinching. Have you considered looking for networking gear through eBay? Did you know that Sam's Club has long-distance calling cards with the incredibly cheap rate of 3.47 cents per minute?

It may even be time to start exploring voice over IP (VOIP) networking. Yes, there's a lot of hype about this technology, so it pays to have a healthy dose of skepticism about those vendor estimates of cost savings. Still, the thought of running voice calls over the Internet — and allowing employees to plug in their IP phones anywhere — is certainly enticing. As a recent Gartner bulletin put it: "There is no doubt that VOIP is the long-term solution for voice. The question is when, rather than if."

This Special Report won't make you a CPA, but it will help you explore a wide variety of cost-saving strategies. Your IT job may depend on it.

Mitch Betts (mitch_betts@computerworld.com) is director of Computerworld's *Knowledge Centers.*



The Story So Far

From the telegraph to Gigabit Ethernet, the emphasis in wide-area networking has always been on speed. By Frank Hayes

WIDE-AREA NETWORKS go back a long way, depending on how you define them: 3,000 years for homing pigeons, or 800 years for Genghis Khan's version of the pony express. But the first large-scale, reliable network for sending messages with a standardized coding system came in 1794, when Claude Chappe built the first working "optical telegraph" system for the French government.

Chappe's "telegraph stations" — large wooden structures with movable arms, spaced six miles apart — could relay a message 100 miles in 30 minutes. That was a day's journey by land. Stations along the way didn't have to decode the messages; they just had to repeat what they received. Similar systems were soon used in Sweden, Denmark, Finland, Norway, Germany and England. By 1830, they were being used to relay private messages in Sweden.

But by 1850, the electric telegraph made the optical telegraph obsolete. In 1844, Samuel Morse's dot-dash code could instantly send a message 25 miles; sending it by train took an hour. Thirty years later, 27-year-old telegrapher Thomas Alva Edison invented a way to send two messages in each direction at once on a single telegraph line. The "Quad" saved Western Union Co. $500,000 per year in construction costs for new lines.

The wires were there. Message multiplexing was there. Switching had to wait until Alexander Graham Bell's telephone created a large, complicated network. In 1889, a Kansas City undertaker named Almon Strowger, who suspected that local telephone operators were steering business to his competitors, hired several engineers to design the first automatic telephone switch.

In 1917, AT&T deployed its first attempt at multiplexing. The A system sent four voice telephone calls at once along a single pair of wires. But by 1944, AT&T's L1 system was transmitting 600 voice channels simultaneously over coaxial cable.

In 1961, AT&T began turning analog phone calls into digital signals by taking an 8-bit digital sample of each call 8,000 times per second. By breaking up each call into digital fragments, more calls could be crammed into the same carrier lines. The T1 system — the same T1 lines used today — carried 24 voice channels.

By that time, there were finally enough computers to make linking them worthwhile. In 1961, Leonard Kleinrock first suggested that digital data in packets could be routed through large computer networks.

The next year, J.C.R. Licklider — the first director of computer research at the U.S. Department of Defense's Advanced Research Projects Agency (ARPA) — proposed a "Galactic Network" that would let users access data from any site on a huge network.

In 1965, Larry Roberts, a researcher at MIT's Lincoln Laboratory, got two computers to communicate using packets for the first time. Four years later, the packet-based Arpanet went live. In quick succession, capabilities for file transfer, e-mail and remote login were developed. In 1973, Vinton Cerf proposed linking Arpanet with two other government networks, and the Internet was born.

Meanwhile, computer vendors were launching networking systems of their own. In 1972, Robert Metcalfe, a researcher at Xerox Corp., worked out a LAN system called Ethernet. In 1973, the first public packet data communications carrier, Telenet, went into business, using the X.25 protocol to let computers connect to its network without a specialized hardware interface. In 1974, IBM announced its System Network Architecture, and in 1976, Digital Equipment Corp. launched its DECnet.

With all the basic concepts in place, wide-area networking has marched forward during the past two decades. So have new technologies — with an emphasis on speed.

The T1 lines AT&T first fired up in 1961 now carry data at 1.5M bit/sec., though customers can buy just part of that capacity if they like (fractional T1). A T3 line is the equivalent of 28 T1s, with a total bandwidth of 44M bit/sec.

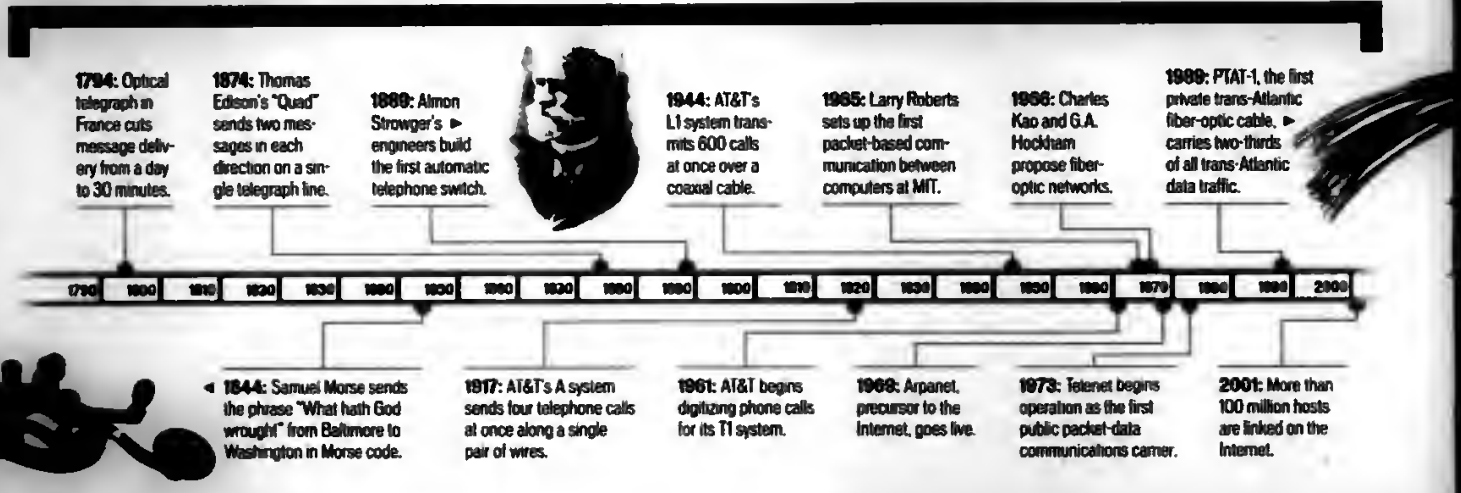
Fiber-optic networks, which weren't even practical when Charles Kao and G.A. Hockham first proposed them in 1966, reached speeds of 90M bit/sec. in 1970, 500M bit/sec. in 1984 and 1.7G bit/sec. by the early 1990s.

Relatively inexpensive frame-relay networks let customers connect at speeds from 56K to 1.5M bit/sec. (and in Europe, from 64K to 2M bit/sec.). Gigabit Ethernet, the latest version of the old LAN standard, supports speeds up to 1G bit/sec.

Asynchronous Transfer Mode, which uses small, fixed-size packets called cells to keep any single type of data from hogging the line, is popular for transmitting video, audio and computer data over the same network at speeds from 22M to 622M bit/sec.

And to make use of those fast public networks, virtual private networks use encryption and other security mechanisms to create a secure network that appears private — making WANs practical for any enterprise that needs them.

And now, on with the story . . .



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Voice Over It's Ready!

GEORGE MALGOZA of Westye Group says his company's VOIP system helped it quickly get back up and running after a flood last year.

IP voice technology finally sounds good enough for the enterprise. And it's cheap. By James Cope

WITH THE ROOF CAVING IN from a torrent of rain and then a gush of more water bursting from a water main and the fire sprinklers, George Malgoza raced to his company's wiring closet and grabbed the data server under one arm and the phone system server under the other and carted them to safety.

Malgoza is vice president of finance and operations at Westye Group Southeast Inc., a distributor of SubZero and Wolf brand kitchen appliances, so he instinctively scooped up items critical to the company's business.

"I ran out of the warehouse like Indiana Jones, water gushing all around ... and grabbed two servers, one under each arm," Malgoza says.

That was on the Friday before Memorial Day last year, when a storm dumped 2.5 inches of water on Westye Group's Orlando warehouse and showroom. By Wednesday, Malgoza had rented temporary office space and had his phone and data systems up and running.

Getting Westye Group's phone system back online in such short order wouldn't have been possible had he been using a typical private branch exchange (PBX) system, Malgoza says. Instead, he was using a Windows 2000 Server-based voice over IP (VOIP) phone system from AltiGen Communications Inc. in Fremont, Calif.

Malgoza says that even before the flood, his positive experience with the IP phone system contradicted earlier popular skepticism about the quality and reliability of the technology.

Like Westye Group, other corporate users, including manufacturing company H.B. Fuller Co. in St. Paul, Minn., and Archer Engineers in Lee's Summit, Mo., say that earlier technology issues, such as echo, delay and jitter caused by network congestion and packet loss, are things of the past.

That's mostly because of advances in quality of service (QOS), says Kevin Wetzel, manager of global network services at H.B. Fuller. "QOS is what allows for real-time applications such as voice to coincide with other real-time and batch applications such as telnet and e-mail," Wetzel explains. "Without this, it's unlikely that you could ever provide consistency in the telephony environment."

Scalability, which some users had considered a problem just over a year ago, has also been resolved, says Wetzel. And he should know: H.B. Fuller is

IP:

in the process of rolling out a global VOIP phone system based on technology from Cisco Systems Inc. As of the end of December, Wetzel says, his company had installed 475 VOIP phones; he expects to have 3,000 phones connected at 30 locations by May.

Where Intelligence Resides

VOIP phones, unlike analog phones wired to a traditional PBX, hook into an IP telephone data server through the same Category 5 cable that connects desktop PCs to a company's data network servers. All of the intelligence for the phone system, including extension numbers and individual preferences for speed-dialing and voice-mail handling, resides on the phone server. So when Malgoza's IT technicians plugged in the phones at Westye Group's temporary location following the flood, the settings for each phone were instantly restored.

Wetzel says he had considered implementing a standard PBX system. However, he discovered after testing and analysis that VOIP was not only equal to switched phone systems in terms of voice quality and functionality but also less costly to install and maintain.

In new buildings, companies need to install only network cabling, Wetzel says; there's no need to run special wiring for the phones. In those instances, payback on the phone system is immediate, he says.

Additions, moves and changes are easier and less costly, too, Wetzel notes, because the server automatically recognizes the media access control address of the IP phone and thereby sets its configuration — wherever the phone is located.

Moreover, managing the phone system doesn't require special staff. In a VOIP system, voice is just another form of data riding on the same corporate network as other data. Wetzel says he anticipates that H.B. Fuller will save $2 million during the next five years by moving to VOIP.

Plugging Into the Net

Mike Medsker, vice president of integrated solutions at Archer Engineers, is calculating his company's return on investment after installing the NBX VOIP system from Santa Clara, Calif.-based 3Com Corp. in three buildings at Archer's new Missouri headquarters. Medsker says he's saving between $1,800 and $2,000 per month over and above the cost of the system, compared with the traditional system, which had 42 separate business lines coming into its previous location.

In the construction business, "requests for engineering proposals and bids are cyclic," Medsker explains, which meant that Archer had to have enough phone lines coming in to handle high call volumes during certain times of the year, although it doesn't routinely need that many. He says the 3Com system has enabled Archer to eliminate multiple lines and aggregate calls over a single T1 line, which provides a gateway to the public switched phone network as well as to the wide-area network linking three of the company's sites in the Kansas City area.

Archer's engineers frequently move between offices, depending on which project they're working on at the time, Medsker says. So now, instead of getting a new phone and extension number, and in some cases printing new business cards, an engineer simply plugs his phone into the network in his new offices. Both the phone and the phone number move with him.

Although the full functionality of VOIP may require special IP telephones that sell for $300 to $700 each, Altigen, Cisco, 3Com and other vendors have made provisions for connecting existing analog phones. Altigen's server has an analog gateway built into the server. 3Com uses special adapters that go between the phone and the network. Cisco's system cross-connects to existing PBX systems, as do those from Avaya Inc. in Basking Ridge, N.J., and Nortel Networks Corp. in Brampton, Ontario.

Will VOIP systems be more widely deployed during the next year or so? Probably, say analysts and IT managers who have examined the state of the technology — at least in new office buildings or where companies are doing major upgrades to their phone systems. But don't expect corporate America to start ripping out those old, faithful PBX systems en masse — especially those that are paid for and work just fine.

How It Works

VOIP involves converting analog voice signals to digital signals that can be sent over IP networks, using a series of software- or hardware-based codecs (COder-DECoder) specified by H.323, a standard set by the Geneva-based International Telecommunications Union. The codecs not only perform analog-to-digital translation; they also compress digital signals so they move through the network more rapidly. H.323 also sets the codecs for video over IP.

But translation and compression aren't enough. Unlike other types of data, where lost and delayed IP packets are eventually collected and reassembled to create coherent information, voice conversations over IP can suffer from echo, delay and jitter when packets don't arrive in the right order or are sidetracked along the way. Anyone who had early IP phone systems experienced the consternation of hearing his own voice echo back and the babble from one end overlapping what's said from the other.

The combination of advances in QOS – in which voice packets are given priority over other packets – plus superior voice compression algorithms and echo cancellation technologies has largely mitigated these problems, at least over private LANs and WANs.

However, using the Internet for voice traffic is still another matter, because there aren't service-level guarantees for voice over the Internet, says Richard De Soto, vice president at Altigen Communications.

Yet he acknowledges that because IP telephony is so inexpensive, some businesses are willing to put up with iffy voice quality – particularly small businesses that make a lot of international calls.

– *James Cope*

Video Over IP Looking Better

As VOIP takes hold, videoconferencing over IP is gaining ground, too.

Videoconferencing systems have traditionally employed integrated services digital network (ISDN) telephone lines. But large companies such as Ernst & Young LLP in New York are moving away from ISDN and toward videoconferencing over their wide-area data networks.

Like VOIP, IP videoconferencing can eliminate telco-supplied ISDN lines, says Craig Brandolino, systems director for audio and video at Ernst & Young. IP-based videoconferencing is also easier to set up, he says. Ernst & Young has been testing Milpitas, Calif.-based Polycom Inc.'s ViaVideo appliance, which plugs directly into a universal serial port on a desktop computer.

Video devices hooked to networked PCs that bring videoconferencing to an individual user's desktop could eventually eliminate the need to provide and schedule special rooms in which to conduct videoconferences, Brandolino says.

He adds that IP network management tools such as Polycom's global management system have improved over the past year or two, thus enabling network managers to control who can initiate a videoconference and when.

"The management system automatically recognizes the [ViaVideo units] when they're plugged in," Brandolino explains. "The network manager can lock down the desktop interface to keep users from going off and making a 1M-bit video phone call without first receiving authorization."

– *James Cope*

Online Exclusive

Lego Systems Inc. elected to upgrade its Avaya PBX system to support VOIP, but some technical issues must first be resolved before switching over to IP phones.

Quick Link

Dow Blazes VOIP Trail

A Fortune 100 company is building an IP voice/data network that could be a role model for other users. By Joanie Wexler

CASE STUDY

THERE'S A GOOD CHANCE that The Dow Chemical Co.'s new IP converged network will be remembered as the industry milestone that finally got the IP telephony ball rolling. The $30 billion global company is building a 50,000-user integrated IP voice/data network.

In partnership with outsourcer Electronic Data Systems Corp. and network equipment giant Cisco Systems Inc., Midland, Mich.-based Dow has completed a pilot of its converged network, DowNet, at selected sites across four continents. Nearly all 450 Dow sites in 35 countries should be operational by the end of the second quarter, says Ray Warmbier, DowNet program manager.

Voice over IP (VOIP) is a hot topic of discussion, but large installations are scarce, particularly in the U.S. Yet Dow is making a wholesale, pioneering commitment to the technology. In fact, the size of DowNet is matched only by Cisco's own worldwide VOIP network.

"People will watch this rollout carefully," predicts Larry Hettick, an Alameda, Calif.-based independent telecommunications consultant who specializes in packet network convergence. "Dow's adoption of IP telephony provides serious evidence to other enterprises that VOIP might finally be ready for prime time."

Why take the plunge? It would seem tough to justify a global network overhaul during a recession. But most of Dow's existing circuit-switched private branch exchanges (PBX) were very old and were running different software versions, explains Warmbier. "Some were upgradable and some weren't. Getting our old PBXs upgraded, replaced and standardized on a global scale would have cost us a great deal of money," he says.

Rather than continuing to invest heavily in legacy technology, Dow turned to IP telephony. It's replacing circuit-switched PBXs with Cisco CallManager IP PBX server software, which runs on standard PC operating systems and hardware. Multiservice routers at Dow sites will shuttle both IP telephone calls and data packets across a common IP virtual private network (VPN) delivered by Equant, a global wide-area networking services provider based in Amsterdam.

The IP VPN service is built on Multiprotocol Label Switching technology, which brings quality of service and privacy to IP networks. The Equant IP VPN replaces a mix of frame relay, Asynchronous Transfer Mode and other wide-area network services at Dow. Plano, Texas-based EDS is installing and managing the entire project and is responsible for delivering on contracted telecommunications service levels.

Savings, Ease of Use

Warmbier says savings will come partially from bypassing the public switched telephone network in many non-U.S. sites where phone calls are expensive. In addition, he says, upgrading and changing standard IP- and PC-based systems is easier than relying on a PBX vendor to change its proprietary telephony software.

AT A GLANCE

Dow Chemical Co.

- **Business:** The No. 2 chemical company in the U.S. A world leader in the production of plastics, chemicals, hydrocarbons and herbicides and pesticides. Merged with Union Carbide Corp. on Feb. 6, 2001. No. 78 on the Fortune 500 list. Known as the maker of Styrofoam.
- **Net sales (2000):** $29.5 billion
- **Net income (2000):** $1.7 billion
- **Top IT executive:** David E. Kepler, corporate vice president for electronic business and CIO

SOURCES HOOVERS.COM, DOW.COM

This network is important to Dow's acquisition strategy. "We want to be able to bring new users from acquired companies into Dow work processes as quickly as possible," Warmbier says.

Dow's ambitions also include deploying new IP-based multimedia applications. The installation of regional Web-based call centers, for example, is expected to improve customer service through real-time, multimedia collaboration between call agents and Dow customers.

Dow is also running unified messaging, whereby users can access voice, e-mail and fax messages from a Microsoft Exchange in-box. The Radicati Group Inc., a research firm in Palo Alto, Calif., estimates that unified messaging provides a productivity gain of about 25 minutes per user per day.

Dow also plans to make use of IP/TV, a Cisco capability for delivering corporate webcasts. "Many of our senior managers want to communicate globally with their people on a regular basis, and this is a very efficient way to do it," says Warmbier.

One reason enterprises have been leery of migrating to VOIP is that they aren't convinced of an IP network's ability to guarantee application performance when voice and data — which have inherently different network performance requirements — coexist.

"At this point, the service we're getting with our [IP] phones is on a par with what we get with our [traditional] phones," says Warmbier. "But we did have to work hard on tuning the routers to eliminate echo on the line."

EDS is responsible for configuring the routers to classify, mark and prioritize Dow's voice, data and video traffic and then coordinating with Equant to make sure the network provides the high levels of service quality required by the contract.

Wexler (joanie@jwexler.com) is an independent IT and networking writer and analyst in Campbell, Calif.

Cost-Cutters

Keeping a sharp eye on bandwidth, invoices and contracts can trim your WAN bills down to size. By Mitch Betts

EMPLOYEES BUY THEIR own cell phones and rate plans to suit themselves. No one ever has time to check those stacks of telecommunications bills that arrive monthly. Bandwidth grows uncontrollably, and contracts signed several years ago just sit in a file cabinet.

If this sounds like your IT shop, there's room for some cost-cutting improvement. The first step: Get "visibility" into your wide-area network, contracts and invoices, because you can't manage what you can't see.

For example, Hold Brothers On-Line Investment Services Inc. installed WAN monitoring tools from Westford, Mass.-based NetScout Systems Inc. to "give us visibility into what was flowing over our network," says Chris Lukas, chief technology officer for emerging technologies at Jersey City, N.J.-based Hold Brothers.

The monitoring allowed the online stock brokerage to identify and clean up network inefficiencies, which saved so much bandwidth that it didn't need to install additional T1 lines. Hold Brothers was able to save $1.1 million per year.

Computerworld asked networking managers, analysts and consultants to suggest other ways to trim the fat.

Money-Saving Tips

- **Go online to purchase used networking equipment** for as much as 75% off list price from Web sites such as those of eBay Inc. and uBid Inc. (Maybe it was hardly used by a failed dot-com!)
- **Renegotiate for new discounts on hardware** every time you sit down with a vendor, even if you got a discount last year. Companies that fail to make their incumbent vendors compete for business often miss out on discounts of 50% or more. And make the used-equipment prices a benchmark for negotiations.
- **Exploit the fierce competition in the reseller channel.** Instead of buying directly from the vendor, you can get a better deal on the vendor's gear from a value-added reseller or a systems integrator.
- **Consider outsourcing certain WAN services,** such as global remote-access capability (see story, page 50), e-mail management or Web hosting of static pages. This can reduce the need to add IT staff. But large-scale outsourcing doesn't work for fast cost-cutting because big deals require a lot of due diligence and upfront administrative costs — and the savings won't show up for 12 months.
- **Hand out discount long-distance calling cards** to your heavy travelers. Sam's Club, for example, has prepaid cards at the incredibly cheap rate of 3.47 cents per minute.
- **Eliminate "maverick buying" of cell phones and rate plans.** Negotiate a master contract, which typically saves $20 to $30 per month per employee. A company with 1,000 mobile workers can save $250,000 to $350,000 per year.
- **Use a bandwidth management appliance to monitor traffic flows** and place limits on bandwidth-hogging applications. Crack down on personal use of the Internet, especially bandwidth-intensive activities such as downloading movie trailers and screen savers or swapping music files.
- **WAN managers should issue a request for proposals to multiple bidders.** Never automatically renew or extend the length of current contracts with providers. Contracts for transport services shouldn't be longer than three years. In many cases, a two-year term, or even 12 to 18 months, is preferable.
- **Check your carrier contract for a "business downturn clause,"** which allows you to decrease the amount of services you pay for if you close 10 out of 25 offices, for example.
- **Use intelligent data service unit/channel service unit devices** that measure actual usage of frame-relay circuits to see if you have overprovisioned your frame-relay network.
- **Have your telephone bills audited every 18 to 24 months** to find overcharges and billing errors, such as a canceled T1 line that's still showing up on the bill. However, hiring a bill auditor may be an unnecessary expense if your internal staff regularly reconciles bills and finds errors on its own. If staffers do this, you won't have to share half the savings with the auditor.
- **Stop paying for network services that aren't used.** One of the most useful statistics from network monitoring is the "zero activity report." There may be a good reason why some network service wasn't used in a particular month, but it still bears investigation.
- **Consider metropolitan-area networks** if your organization has two or more sites in one large city (see story, page 44).
- **Users of T1 lines should consider moving to frame relay,** and users of frame relay should consider moving to a virtual private network, according to conventional wisdom.
- **But conventional wisdom can be outdated, too.** One IT manager saved money by switching from an expensive frame-relay setup to point-to-point leased lines, which have dropped sharply in price. So re-examine old assumptions about what's cheaper. ▶

Tipsters

The following industry experts provided the various cost-cutting suggestions:

Frank Dzubeck, president of Communications Network Architects Inc. in Washington

[illegible], an analyst at Gartner Inc. in Stamford, Conn.

[illegible], director of corporate marketing at [illegible] Inc. in [illegible], Calif.

Chris Lukas, chief technology officer for emerging technologies at Hold Brothers On-Line Investment Services Inc. in Jersey City, N.J.

Lisa Pierce, an analyst at Giga Information Group Inc. in Cambridge, Mass.

[illegible], president of [illegible] Networking Associates Inc. in Greensboro, N.C.

AVAYA

COMMUNICATION WITHOUT BOUNDARIES

KEVIN FOGARTY

Don't Plunge Into VOIP

But at my back, I always hear
Time's winged chariot hurrying near;
And yonder all before us lie
Deserts of vast eternity.
— "To His Coy Mistress," by Andrew Marvell, 1681

I always loved that verse, partly for its metaphysical beauty, but more for the misuses to which it's put.

Can it be seen as a poignant admonition to not waste a moment of your short life and to, instead, leap at every new opportunity that life offers you, as the writers of high-tech ad copy would have you think?

OPINION

Well, yeah, kind of. But it was written as a seduction poem, one of a whole class of verse ostensibly created to persuade 17th century lasses to say "yes" to more things than would really be wise.

In the IT world, that same argument — buy now or the pace of change will leave you behind — is applied to whatever technology is hot at the moment.

Voice over IP (VOIP), for example, has been something of a perennial suitor whose fussy nature has pushed it back into the pack of technologies vying for the CIO's attention, despite its potential. The quality of service it delivers has been improving, however, and new VOIP router packages from Cisco and others are making VOIP nearly practical enough to fall for.

It has its attractions, after all, though they're largely unproven. If you can replace your old PBXs with newer equipment that will make your old network do double duty as a voice carrier, you not only cut the volume and cost of your phone traffic, but you also eliminate the need to support both voice and data networks, while adding functions like unified messaging and Web-based call centers.

Evolution, Not Revolution

Gartner Inc. expects most companies to begin a migration to IP-based telephony between 2003 and 2005, but it loudly warns that VOIP "remains an emerging, evolving technology, and the transition to it will come gradually, despite attempts by Cisco and others to talk up the market."

Kevin Fogarty is a former editor at Computerworld. Contact him at [redacted]

VOIP still lacks important features like security measures that can ensure that your IP calls aren't being intercepted as well as simpler functions, such as the ability to look someone up and initiate an IP-based call.

Enum, a protocol finalized by the Internet Engineering Task Force more than a year ago, is an attempt to solve that problem by offering a standard way to build directories that list IP telephony and e-mail addresses plus fax and cell phone numbers within IP-based networks. Another developing specification, Session Initiation Protocol, is designed as a standard way to signal the start of a VOIP phone call or chat session.

Without systems like those and directories that use them, it can be difficult to identify whether a call has to be routed through a traditional PBX, a VOIP gateway or over the network to a phone your router knows is connected by VOIP.

In addition to the technical limitations of VOIP, the way in which vendors sell it is nonstandard enough that users who don't go through a rigorous (read: slow) competitive analysis and request-for-proposal process risk paying 25% to 60% more for VOIP systems than they should, Gartner warns.

Still, a migration to voice over IP makes sense.

But only when you, and your network, are ready to deal with the new problems that will, inevitably, pop up. Among other things, if you already get enough complaints about the reliability of your data network (justified or not), why up the ante by putting voice traffic on the same backbone?

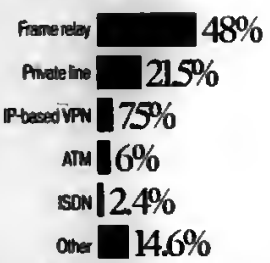
Better to focus on the basics and make sure the network itself is stable by upping your bandwidth and stability using optical Ethernet or other solid networking technology that may be less sexy than VOIP, but infinitely less flighty as well.

There is, after all, a limit to how far you should twist the purpose for which anything was designed, without redesigning it first.

Network Snapshots

Corporate WAN Technologies

Since 1995, frame relay has come into its own as a mass-market business service

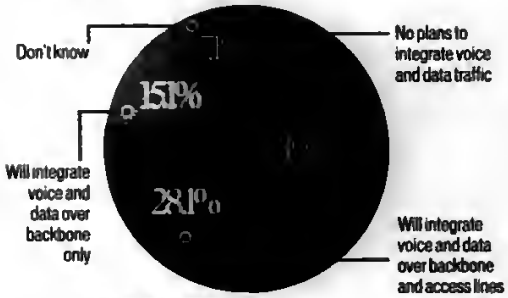


Base: Survey of 400 U.S. wide-area network managers, asked which technology dominates in their WAN

SOURCE IDC FRAMINGHAM MASS. MARCH 2001

Voice/Data Integration

Asked about their plans 12 months out, many companies say they have no intention of integrating voice and data wide-area network traffic.



Base: 400 wide-area network managers

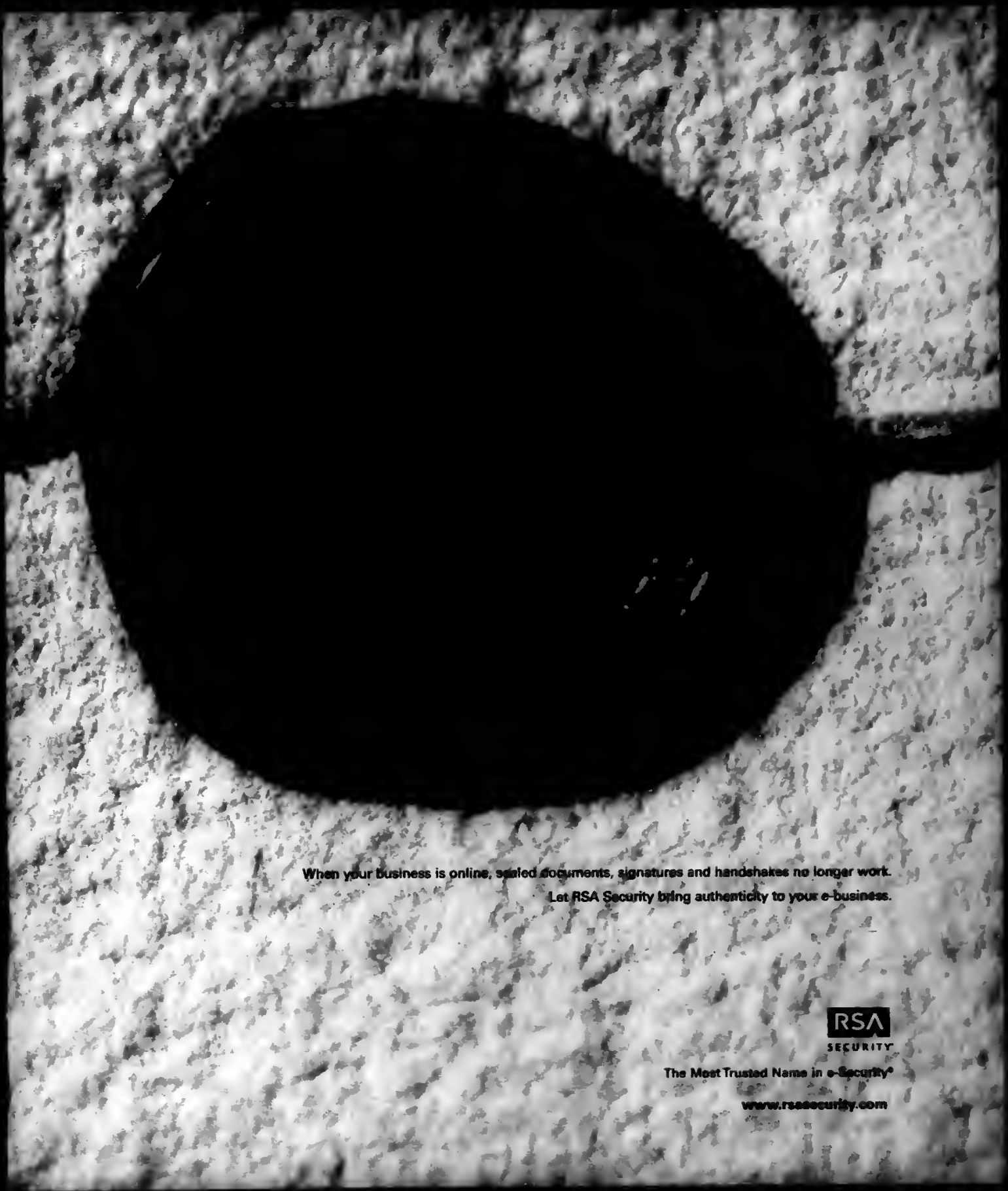
SOURCE IDC FRAMINGHAM MASS. NOVEMBER 2001

The Nightmares

152 IT managers identified the following items as their worst nightmares about network equipment:

- Human error
- Security breaches
- Server failure
- Power outages
- Poor service from outside providers
- Natural disasters or other catastrophes
- Staffing problems
- Inability to anticipate, avoid or respond to network downtime
- Adverse effects of downtime on company operations

SOURCE NETBOTZ INC. AUSTIN, TEXAS. MAY 2001


When your business is online, sealed documents, signatures and handshakes no longer work.
Let RSA Security bring authenticity to your e-business.
RSA
SECURITY
The Most Trusted Name in e-Security®
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They're fast. They're optical. And metropolitan-area networks are gaining ground against traditional carrier services. By James Cope

WHEN DAN BRINDELL, director of network engineering at ACTS Retirement-Life Communities Inc. in West Point, Pa., looked for a way to connect multiple locations over the same network, he considered using frame relay or leasing optical fiber. But at 256K to 512K bit/sec., frame relay was too slow for the IP videoconferencing system Brindell wanted to implement, and leasing "dark fiber" on his own was prohibitively expensive.

So he turned to San Francisco-based Yipes Communications Inc. to set up a metropolitan-area network (MAN) connecting eight sites in the Philadelphia area over optical Ethernet.

Although telecommunications carriers have had fiber circling big cities for years, the MAN is a relatively new phenomenon. It began a few years ago with a new breed of service provider that now includes Yipes, Telseon Inc. in Englewood, Colo., and Cogent Communications Inc. in Washington. They've tracked down dark fiber — optical fiber that was already in the ground but largely unused — and lit up large optical Ethernets in several cities.

MANs fulfill critical needs for network managers, says John Mazura, an analyst at Gartner Inc. in Stamford, Conn. Respondents to a Gartner survey of 150 enterprise users listed optical Ethernet and bandwidth capability as top priorities, he says.

Other users agree with Brindell on the viability of Ethernet MANs for fast, scalable connections. Chicago-based law firm Freeborn & Peters uses a Yipes MAN to connect to the Internet. Incyte Genomics Inc., one of Telseon's first customers, blasts data at 100M bit/sec. over its MAN to a data center 18 miles away. And Rudin Management Co., a New York-based real estate management firm with a key building near the World Trade Center, was able to keep communications up and running in the aftermath of the Sept. 11 terrorist attacks by connecting with Cogent's MAN (see "MAN Replaces T1 in Disaster Aftermath," next page).

It's even possible to link two metropolitan networks for a MAN-to-MAN connection. That's what Calpine Corp., a wholesale electricity producer in San Jose, is doing, thus creating what Yipes calls a national-area network (see "MAN-to-MAN Coverage," next page).

How It Works

- The service provider leases optical fiber traversing a metropolitan area.
- Separate fiber-optic lines connect buildings along the provider's main fiber route to the citywide network.
- Enterprise customers hook into the MAN via a Gigabit Ethernet switch that the provider installs on customers' premises.
- Customers can increase their bandwidth across the MAN as required up to one 1G bit/sec., usually in increments of 2M to 5M bit/sec.
- A MAN employs Ethernet network standards for simplified connection to existing LANs.
- However, MANs aren't available in many metropolitan areas, especially smaller cities.

MAN on th

But in some locations, MAN providers haven't yet set up shop; in others, a single provider would have a hard time finding enough dark fiber. So some organizations have had to be creative. For example, packaged goods giant Procter & Gamble Co. built its own MAN connecting seven campuses in its home city of Cincinnati. And the city of Chicago is in the early stages of a 10-year project to build an optical network for local government, businesses and institutions [News, Jan. 7].

Gartner's Mazura says MANs have a leg up on frame-relay, T1 and T3 lines by virtue of their bandwidth-on-demand capabilities. Enterprises can subscribe to a MAN service in increments of 2M to 5M bit/sec. Telseon officials say users can turn up bandwidth in a few seconds via a Web-based control screen. Yipes says it can turn up bandwidth in an hour. And users say that throughput of up to 1G bit/sec. across MANs is possible.

Plus, it's all Ethernet, the standard on which most LANs are based. That's a big deal for enterprise users, Mazura says, because "now you can plug that directly into your RJ45 port instead of buying multiple T1 cards."

Using traditional connections, users can add more T1 lines as needed or go to a T3, but there's really no middle ground between the two, Brindell says.

Bob Lynn, director of technology at Freeborn & Peters, disagrees. He uses a burstable T3 line from Level 3 Communications Inc. in Broomfield, Colo., for his firm's Internet access. The T3 ordinarily runs at 3M bit/sec., but it can automatically burst up to 45M bit/sec. when traffic demands it.

"Level 3 samples the [bandwidth] rate every five minutes," Lynn explains. "As long as it's 3M bit/sec. or under, we pay our regular rate of $3,200 per month." He says Freeborn & Peters can burst 10% beyond the 3M bit/sec. threshold without incurring extra costs.

But Lynn hasn't put all of his firm's Internet eggs in one basket. He's also established a relationship with Yipes and hooks into that provider's Chicago-area MAN for a redundant route to the Internet. The Yipes service costs Freeborn & Peters $3,200 per month for a set bandwidth of 5M bit/sec. Lynn says he can increase that to 100M bit/sec. or more with a phone call.

Philip Kwan, associate director of network operations at Incyte Genomics, has a different view. His firm supplies massive amounts of data to human genome researchers at private labs and universities. Kwan says a burstable T3 line for Internet connections could be financially disastrous if several customers — each sometimes downloading 150MB for a single data update — were to log on concurrently. "I could have a $30,000 bill coming for a month's service," he says.

But Kwan says he allayed his fears of high bills and resolved his massive bandwidth requirements by using a MAN between Incyte's headquarters in Palo Alto, Calif., and its data center in Santa Clara, Calif. The Ethernet link runs over Telseon's optical MAN infrastructure at 100M bit/sec. "We have 1,400 to 1,600 servers, and we update multiple gigabytes of data on these every two weeks," he says.

Still, MAN providers are constrained by the availability of existing optical fiber in metropolitan areas — no fiber, no MAN, says analyst Barry Moon at RHK Inc., a research firm in South San Francisco, Calif. If the economy remains tight, fiber infrastructure suppliers may not want to lay more fiber, thus putting a ceiling on the near-term growth of MAN providers.

MAN-to-MAN Coverage

A year ago, Calpine Corp. connected three of its sites in downtown Houston with a 3M bit/sec. Asynchronous Transfer Mode (ATM) network from AT&T Corp. However, the power company needed more bandwidth and elected to change to a native Ethernet connection from MAN service provider Yipes.

The Yipes service in Houston typically operates at Fast Ethernet speeds of 100M bit/sec. But Sean Curry, Calpine's chief network engineer, says that Yipes – upon request – can increase the bandwidth capacity to up to 1G bit/sec. in about an hour.

The ATM link through AT&T was costing his company 10 times more than what it now pays Yipes, according to Curry.

And now Calpine is preparing to push Ethernet connectivity even further.

Curry says he will soon begin tests to determine the viability of an Ethernet-compatible network link between Calpine's data centers in San Jose and Houston.

The current connection between the two sites is a 3M bit/sec. private virtual circuit made up of two T1 lines, Curry explains. He says he hopes that by extending the Yipes service, he can eventually connect the two data centers at speeds of up to 1G bit/sec.

Tim Weis, an analyst at TeleChoice Inc. in Tulsa, Okla., says Ethernet for MAN connections – and for even longer hauls – is an up-and-coming technology that in some instances could displace traditional ATM and frame-relay services.

"What's really driving Fast Ethernet and Gigabit Ethernet is the reduction of complexity," Weis says. "Frame relay and ATM simply don't match up real well with LAN speeds [of 10M bit/sec. and higher]."

Plus, he notes, the ability to run a single standard, Ethernet, across the whole connection enables companies to create virtual LAN services across the WAN.

"You can sit in your office in Houston, and you won't notice or care if your resources are in San Jose, for example," Weis says.

Although Yipes' Ethernet service has worked well between buildings, Calpine doesn't plan to fully implement the faster link between its sites right away, says Curry.

"If everything works as planned, we'll implement it in the fourth quarter of this year," he says.

"I would like to see a 100M bit/sec. link between here and San Jose," says Curry. "Even if I had just a 45M bit/sec. link, I could take this to a gigabit in a matter of hours."

"You can't get even get someone from [the phone company] in an hour," Weis says.

– *James Cope*

Metro Net Replaces T1 In Disaster Aftermath

When disaster struck the World Trade Center on Sept. 11, New York-based Rudin Management Co. lost the T1 line connecting its 345 Park Ave. headquarters to its facilities at 32 Avenue of the Americas.

Joe Idler, the company's vice president of IT, says he figured it might take weeks to restore the real estate management firm's T1 line.

So instead of waiting, he asked Cogent Communications, which was already providing Internet access via its MAN to Rudin's Park Avenue location, to see if the company could also connect the Avenue of the Americas site to the MAN.

Much to Idler's relief, Cogent had the two sites up and running on the 100M bit/sec. MAN in less than a week.

Idler says he has also connected a third site into the Cogent MAN, creating not only a fast network for day-to-day activities, but also one that should be able to survive any future disasters.

He says the fiber-optic network runs in a ring around Manhattan. "If there's a break in the ring, traffic is routed the other way [away from the break]," Idler explains.

– *James Cope*

e Run

Optical Networking

BY RUSSELL KAY

REMEMBER THOSE World War II Navy movies where a sailor on one ship signaled to another by flashing Morse code with a large, shutter-equipped spotlight? The receiving ship then flashed the same message to the next ship in the fleet. That's digital optical transmission, and it's essentially how an optical network works.

Replace the spotlight with a laser, the Morse code with a transmission protocol, the shutter with switching circuitry, the air between the ships with glass fiber, and the receiving ship in the middle with an optical repeater. The result is totally different yet fundamentally similar.

After decades of development, optical networks have emerged as feasible alternatives to traditional copper cabling or wireless networks, offering much greater capacity and higher transmission speeds along with the ability to handle multiple simultaneous transmissions. The first main market for optical networking will be traditional telecommunications networks.

Why Optical?

Two words explain the trend toward optical networking: *capacity* and *speed*. Today, a good Category 6 copper network cable can carry a single data transmission at a rate of 1G bit/sec. An optical fiber as thin as a human hair can handle multiple transmissions simultaneously at speeds of more than 10G bit/sec., and it's getting faster.

Several factors contribute to the differential. Light travels many times faster than electrons, and photons don't interfere with one another the way electrical signals do.

At the heart of optical networking is optical fiber, which consists of a narrow thread of glass — actually pure silicon dioxide — that's been clad with another glass that has a different index of refraction. A light signal introduced into the central fiber is reflected off the edges of the fiber as it travels along its length and thus doesn't disperse or scatter. Still, impurities in the fiber eventually absorb some fraction of the light, causing signal degradation. This requires the use of repeaters that receive a signal and amplify it before sending it over the next fiber segment.

In the 1970s, fiber losses amounted to about 20 decibels per kilometer — a loss of about 99% of the signal. Today's fiber technology has losses of 0.2 to 0.3 decibels (5% to 7%) per kilometer. This allows fiber segments of up to 100km or more, making optical fiber economical over very long distances. There's at least one fiber-optic trans-Atlantic undersea cable currently in operation.

Another needed element of optical networking is the coherent light produced by a laser that can rapidly turn on and off. LEDs have an upper limit on the optical signals they can create of around 300M bit/sec., while lasers are currently operating at 10G bit/sec. and should be able to go much faster still.

Current optical networks use electronic transmitters and repeaters to amplify a signal. The conversion of light to electrons and back again is a limiting factor. Future generations of all-optical networks using tunable lasers that are able to emit several discrete frequencies will help eliminate this conversion requirement and its overhead.

Another key to high capacity is the use of wavelength division multiplexing, in which different signals are assigned to different wavelengths (colors) of light. This allows many channels to be transmitted simultaneously — the transmission of more than 1,000 concurrent wavelengths has been demonstrated in the laboratory.

One final piece of the optical networking puzzle is Synchronous Optical Network (Sonet), a standard for connecting fiber-optic systems to existing digital carriers. This ANSI standard defines how data streams at different rates can be multiplexed. Sonet establishes optical carrier (OC) levels ranging from OC-1 at 51.8M bit/sec. (about the same speed as a T3 line) and running up to OC-768 at 40G bit/sec. Sonet is used in the U.S., Australia and Japan. A nearly identical International Telecommunications Union standard, called Synchronous Digital Hierarchy, is used in the rest of the world.

One important thing to keep in mind is that optical networking is primarily a backbone, wide-area technology. Optical LANs will certainly appear, but in the near future, most installations will use existing copper wire to make the final jump from the optical WAN to the LAN, the home or the end user. Still, for the high-speed, high-capacity network of the future, you're certain to find optical fiber at its core. It gives a whole new slant to terms like *bandwidth* and *broadband*.

DEFINITION

Optical networks transmit data by sending laser light through filaments of glass fiber; this distinguishes them from traditional networks, which transmit electrical signals along copper wires. Although optical hardware and transmission media are more expensive, they can handle far higher capacity loads at significantly faster speeds.

AT A GLANCE

Further Reading

www.lightreading.com/
A primary source for news and background information on all aspects of optical networking.

www.osa-jon.org
This is the newly begun *Journal of Optical Networking* (first issue, January 2002).

Mind at Light Speed: A New Kind of Intelligence, by David D. Nolte (The Free Press, 2001). An excellent and highly readable introduction to how optical communication works, as well as how it will be used in the future for computing and transmission.

Understanding Optical Communications, by Harry J.R. Dutton (Prentice Hall PTR, 1998).

Online Exclusive

For a list of standards pertaining to optical networking, visit the *Computerworld* Web site: [illegible]

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Inspecting

An unexamined network isn't worth the risk. Watching for application bottlenecks with monitoring software can keep users happy — and costs down. By Mark Hall

SAM SPADE, SHERLOCK Holmes and Miss Marple had it easy. They only had to solve diabolical crimes. IT professionals, oo the other hand, must unravel the mysteries of performance and availability for networked applications.

Brian Whitehead, vice president and chief technology architect at Standard & Poor's, says the problem is so complex that until last May, he had eight people working full-time to monitor a network of Sun Solaris servers that delivered critical financial informatioo over the Internet to his company's customers.

"Ours is a missioo-critical Web site," he points out, "given that virtually all the money we generate is by these Web services."

For Standard & Poor's, a $1.2 billioo division of The McGraw-Hill Cos. in New York, if the availability or performance of a networked application falls below what's specified in service-level agreements (SLA) witb customers, it costs the company money. So having such a large staff to proactively monitor and manage the software seemed like a good investment. But manual oversight was clearly expensive. And what was worse, from Whitehead's perspective, was that it was inefficient.

"It was problematic and not very thorough," he recalls.

In May, however, the company invested in Topaz, a monitoring and management product from Mercury Interactive Corp. in Sunnyvale, Calif. Although Topaz "is one of the more expensive solutions out there," given the importance of the applications it monitors, Whitehead says, it's worth every penny.

Standard & Poor's has written 60 custom scripts — 40 in the first two weeks it had the product — that observe everything from whether an applicatioo is available to the timeliness of the information being delivered

across the Web. For example, if Topaz discovers that a stock price hasn't been updated recently, it alerts an editor that the content needs to be refreshed.

The software also stress-tests the application over the Internet. "It lets us impersonate our customers by pounding on [Web] pages every minute," says Whitehead.

Imitating the User

For Joe Romello, CIO and vice president of engineering at Global Sports Inc. in King of Prussia, Pa., mimicking user behavior does more than help him determine availability; it helps him plan for network capacity and server workloads.

Global Sports runs the Web businesses for many brick-and-mortar firms, Romello says. For example, it licenses San Francisco-based BlueLight.com LLC's name from Troy, Mich.-based Kmart Corp. and not only runs BlueLight's Web site but also maintains a warehouse, delivers products to shoppers and integrates its operations with store systems so customers can return goods in person.

"Customers and even store employees can't tell that BlueLight.com is run by a separate company," Romello says.

To earn that level of trust from Kmart and dozens of other companies, Global Sports signs SLAs that guarantee application availability and user response time. And it uses agreed-upon metrics provided by the Red Alert service from Keynote Systems Inc. in San Mateo, Calif.

Keynote has a program installed in 60 U.S. cities that tests the availability and round-trip response time of Internet-based applications for its users. Global Sports subscribes to a Keynote service that mimics user behavior via scripts that do everything from sending page requests to ordering products.

Romello says Red Alert's reports have been instrumental in maintaining SLA requirements during crises. Once, when a fire in a Baltimore tunnel knocked out a major Internet connection last year, Romello got enough of a warning to be able to reroute network traffic farther west.

Equally important, he says, is that Red Alert helps him plan load-balancing and network capacity priorities. For example, Global Sports works closely with Kmart marketing managers who often run regional promotions that create traffic spikes on BlueLight.com. With the historical data Romello gets from Red Alert, he's able to anticipate how much extra server or communications capacity will be needed to handle the increased traffic.

"Red Alert lets us watch the Internet weather," Romello says. "If AOL is backed up, it's like Chicago affecting air traffic."

Monitoring Tools

BMC Software Inc.
- SiteAngel
- GuardianAngel
- Patrol

Keynote Systems Inc.
- Custom Perspective
- Enterprise Perspective
- RedAlert

Mercury Interactive Corp.
- Topaz
- ActiveWatch

Verifiable Metrics

Rick Sturm, an analyst at Enterprise Management Associates Inc. in Boulder, Colo., and author of *Foundations of Service Level Management* (Sams Publishing, 2000), says it's essential to build third-party metrics into an SLA with a service provider.

"Can you trust a service provider to honestly measure the service and support?" he asks. "In some cases you can, in some not."

Sturm says many users are naive about SLAs and don't ask for independent verification of metrics in a contract. But they should, he says.

Vericenter Inc., a managed service provider in Houston, incorporates metrics into its SLAs that are derived from network and application monitoring and management tools from BMC Software Inc., also in Houston.

Dave Colesante, chief technology officer at Vericenter, says his clients — primarily banking and oil firms in the region — agree to a set of performance and availability measurements based on BMC's software.

Because BMC integrates information from its Internet-based tools, such as SiteAngel and GuardianAngel, into Patrol, its enterprise management product, Vericenter is capable of offering a three-tiered SLA, says Ron Pollvogt, the company's vice president of product management. That way, users aren't restricted to a single level of service.

Naturally, he says, users pay more for higher-quality SLAs. But because Vericenter doesn't "own" the user's application, the highest level of guarantee in the SLA is on availability.

Qwest Communications International Inc. in Denver is rolling out an aggressively tiered approach to its business users, according to Martin Capurro, director of IP product management. Qwest is using Keynote's technology to offer an SLA that guarantees application performance levels and availability.

"This kind of SLA will give us a competitive advantage," says Capurro.

Products like Topaz, Red Alert and GuardianAngel all give users the ability to directly monitor their SLAs. Because they're Web-based, they let users peer into the metrics of a network application's performance and availability through a browser, even when used as a subscription service.

This is an important component to add to any SLA, says Neil Goldman, an analyst at The Yankee Group in Boston. "You want to know what your user is experiencing," he says.

SLAs: Money Trees?

Brian Whitehead, vice president and chief technology architect at Standard & Poor's, says it isn't just service providers that can generate more revenue or offer competitive advantages through tiered SLAs. Companies that sell certain kinds of products can also profit from SLAs, he says.

"Because monitoring and management is so granular now, we can measure each [Web] page and paragraph and data element precisely," says Whitehead.

For a financial services information company such as his, that creates the potential for increased sales.

"We can sell our Web site in different pieces with different SLAs," he says. For example, if a customer wanted the best SLA guarantees for instant credit-rating reports, the granularity of the monitoring system would make it possible for Standard & Poor's to deliver that service in addition to the overall financial data a customer may pay for, which may be delivered in an aggregate form.

Neil Goldman, an analyst at The Yankee Group, is skeptical. "I wonder about the business uptake of using SLAs like that," he says.

He acknowledges that in the case of Standard & Poor's, "the potential is interesting." But such opportunities will be scarce and "based on the criticality of the app," he says.

Goldman says it's wiser for companies to use their SLAs to build competitive advantage by establishing reputations for reliability and excellent response.

Joe Romello, CIO and vice president of engineering at Global Sports, agrees. He says companies should use network and application monitoring and management tools to guarantee that SLAs are "about stability and reliability."

"Customers can't look to us as a risk," he says. "They must see us as an asset."

– *Mark Hall*

the Net

Remote A

Corporations are letting outsourcers handle the chores of providing Net access to global travelers and domestic telecommuters. By Bob Brewin

THOUSANDS OF ROAD WARRIORS across the globe are trying to plug into the corporate network to retrieve e-mail and data. And the pool of domestic telecommuters — which has been growing 15% to 20% each year — wants to have the same IT capabilities as workers at headquarters. It's enough to give a network manager headaches.

So some big-name companies are outsourcing their remote access problems to service providers like AT&T Corp. and GRIC Communications Corp. in Milpitas, Calif.

Outsourcing global dial-up service not only saves money; it also makes life easier for enterprise IT staffs, says Gary Robertson, chief technology officer at Delphi Automotive Systems Corp. in Troy, Mich. Outsourcing remote access is much simpler than installing and maintaining the modem pools required to support mobile workers and telecommuters in a firm whose operations span 43 countries, he says. Though the primary access method for Delphi remains plain-old dial-up connections, once users are logged in, they can tap into an advanced virtual private network (VPN) that provides a lot more functionality than just e-mail services.

The Delphi remote access system also saves the company money by routing all VPN sessions through regional VPN concentrators around the world and onto a global high-speed network outsourced to AT&T.

For example, a traveling Delphi engineer staying overnight at a hotel in Paris can click on an access icon on his laptop screen, select a local number and hit "Connect" and he's logged on to the network. From there, his traffic is routed to the nearest VPN concentrator, onto the global network and then back to an SAP AG engineering application in Michigan, explains Chuck Maiorana, Delphi's director of communications engineering.

Delphi has gained additional leverage from its remote access system by incorporating new products from Brampton, Ontario-based Nortel Networks Corp. that allow it to shunt voice traffic from a digital private branch exchange to a phone at a remote office or the home of a telecommuter. "This means you have the same number at work that you have at home," Maiorana says, adding that the Nortel system can be used with either digital or IP-based phones.

Delphi has already provided remote access VPN capabilities to between 5,000 and 6,000 of its mobile workers — salespeople, executives and engineers — and is gradually rolling it out to the rest of the company's 13,000 laptop users.

Actually, mobile users don't even need a laptop, Robertson says, because they can also make a VPN connection through any computer with a Web browser. All Delphi employees, from the manufacturing line to the executive suite, can tap into a company-sponsored Internet access program through New York-based AOL Time Warner Inc., according to Robertson.

Dial-up vs. Broadband

Though the Delphi remote access VPN system will work with broadband connections, the company doesn't subsidize broadband. And broadband service is still so spotty, Robertson points out, that three CIOs who live on his suburban street can't get broadband connections from either cable or Digital Subscriber Lines (DSL).

There's growing demand for broadband connec-

Emergency Plan B

Users eye remote access as a disaster recovery option

Besides supporting mobile and remote workers, remote access technology has picked up a new role since the terrorist attacks in September. It serves as insurance that a business can continue operating even if an office is knocked out by a natural or man-made disaster.

John Girard, an analyst at Gartner Inc. in Stamford, Conn., says the World Trade Center tragedy has provided a new push for incorporating remote access into disaster planning. If an emergency strikes, "you want to ensure people can work anywhere to restart the business," he says.

Girard says sound disaster planning requires "the networking and telecom group to deal with a whole series of connectivity and business process issues and scenarios." That includes the development of a companywide remote access system, in addition to having an inventory of existing employee assets, such as who has dial-up Internet access and who has higher-speed cable modems or DSL connections.

Enterprises large and small are scrambling to develop remote access systems, according to Barry Williamson, product manager for VPN services at AT&T. "We've seen a significant uptake in interest in remote access services since September," he says.

Companies with well-established remote access capabilities are definitely seeing the advantage of using them as part of a disaster recovery plan.

Peter Brown, director of global operations at PricewaterhouseCoopers, says that while the company hasn't formally incorporated remote access capabilities into its disaster recovery plan, "it is another tool in our quiver to help with disaster recovery."

GM hasn't made remote access part of its formal disaster recovery plan yet either. But Tony Scott, CTO for the company's information systems and services organization, says remote access, especially for key executives, took on greater importance Sept. 11, when GM executives were in Germany at an auto show. Remote access to the company's VPN ensured that they could keep in touch as easily as if they were back at headquarters in Detroit, Scott says.

– Bob Brewin

Get It Wholesale

When even a global colossus like GM determines that it's cheaper and easier to outsource enterprise remote access, it's probably a good idea to pay heed.

The three companies noted here provide global access services that provide entry into a corporate network for the price of a local phone call. Each service claims to provide such access in more than 15,000 locations worldwide at a flat rate per user.

How do they do it? They make wholesale deals with Internet service providers and carriers in the U.S. and abroad and then pass on the savings to corporate users – who, in turn, make their own wholesale deals for remote access, leveraging their large pools of and users.

Each provider offers a software "dialer" that lists its access points by city and country worldwide. All the end user needs to do is select the country and city, find the number, hit "Connect" and log on. Enterprises can also sign on with more than one provider and custom-build their own dialers, which come with VPN software.

1 GRIC COMMUNICATIONS INC.
Milpitas, Calif., (408) 955-1920
www.gric.com

- Partnership with 300 Internet service providers and telecommunications carriers in 150 countries for dial-up access.
- Plans to offer broadband wireless access using the Wi-Fi industry standard at more than 1,000 global locations over public-access wireless networks.

2 FIBERLINK COMMUNICATIONS CORP.
Blue Bell, Pa., (215) 793-6300
www.fiberlink.com

- Global telecommunications partners include AT&T, Qwest Communications International Inc. and WorldCom Inc.'s UUnet Technologies Inc. subsidiary.

3 IPASS INC.
Redwood Shores, Calif., (650) 232-4100
www.ipass.com

- Partners include Internet service providers and telecommunications carriers in 150 countries.
- Offers wireless access in the U.S. through deals with Wayport Inc. and Concourse Communications Group LLC, which provide public-access Wi-Fi networks in airports. Austin, Texas-based Wayport also offers broadband hotel access.

tions, analysts and users say, but most enterprises are still heavily dependent on dial-up remote access. Larry Quinlan, CIO at Atlanta-based Deloitte Consulting, says dial-up remote access is a "necessary evil" that will remain a communications mainstay for mobile workers and telecommuters until broadband access becomes as ubiquitous as dial-up service.

Justifying Costs

But automotive manufacturer General Motors Corp. has already embraced broadband access for its 1,600-employee sales and marketing force, says Tony Scott, CTO for GM's information systems and services organization. Those employees can use a broadband VPN service whether they're at home, in a hotel room or at local dealerships.

GM has totally outsourced its communications, including remote access. AT&T provides the backbone, and Plano, Texas-based Electronic Data Systems Corp. manages the infrastructure.

The broadband connections provide GM's mobile sales force with rapid and secure connections to applications that provide information such as service bulletins and product updates. And for end users who spend hours online daily, the broadband service can be cheaper than a dial-up service. But not many of GM's 40,000 remote workers spend that much time online, so the majority will still use dial-up, Scott says.

Peter Brown, director of global operations at New York-based PricewaterhouseCoopers, says a user needs to spend "eight to 10 hours a day, 20 days a month" to justify the cost difference between dial-up and broadband connections.

On the other hand, some end users need broadband because they routinely download large files.

"Power users tend to migrate to broadband," Brown says. But that's not easy to accomplish, he says, because "there is not a good national supplier of broadband." Like other major enterprises, PricewaterhouseCoopers relies on remote access aggregators that provide remote access to the company's network for the cost of a local phone call.

The good news is that, although demand for remote access is continuing to grow, costs are continuing to decline, says Scott. He says the company received bids in December for remote access services that were "significantly lower" than what the company is paying now. ▶

ccess Hassles

BILL SCHWARTZ

Tokens, smart cards and biometrics are gaining ground for network user authentication.

By Deborah Radcliff

Beyond Passwo

IN THE CITY OF STOCKHOLM, 85,000 elementary school students log on to servers inside the city LAN to get their classroom resources. And just like the eod users in most businesses and municipalities, the Stockholm students often forget their passwords. Plus, teachers are stuck with the burden of issuing new passwords every 100 days in accordance with city policy.

But corporate America could learn something from the network professionals in Stockholm. In October, the school district embarked on a new authentication method with something they don't need to memorize and can't lose: their fingerprints.

The city's 450-seat pilot project is just the beginning. By March, the $100 fingerprint readers from Bellevue, Wash.-based Saflink Corp. should be in use on all of the school district's 25,000 computers, says Samir Hamouni, project manager in Stockholm's executive IT department. And by next year, he anticipates that all city government workers — 120,000 computers in all — will authenticate using smart cards, tokens or biometrics.

Passwords aren't the only game in town anymore. The smart card and token market is already heating up. What was a $314.5 million market in 2000 will reach $2.2 billion in 2005, according to a November study by IDC in Framingham, Mass. The biometrics market, dominated by fingerprint readers, is also starting to grow, from $119 million in 2000 to a projected $887 millioo in 2005.

This isn't a situation in which only one technology will prevail, because sophisticated companies may use multiple techniques for network user authentication.

"I think there's going to be a high degree of synergy between biometrics, smart cards and tokens as larger companies broaden their installation of multifactor authentication to a greater number of users," says Chris Christiansen, security research director at IDC. "I like the analogy of apartment doors in New York City. They don't just have a lock. They have a slew of locks and chains and even steel bars."

Despite the many methods available, user authentication falls into one of three broad categories: what you know (passwords, personal identification numbers or other forms of challenge response), what you have (smart cards, tokens or computer hardware identifiers such as serial numbers or IP addresses) and what you are (biometrics). Each form has its drawbacks and

benefits, says Richard Smith, author of *Authentication: From Passwords to Public Keys* (Addison-Wesley, 2001).

For example, there's no way yet to dole out tokens or smart cards to millions of customers for big business-to-consumer applications, so passwords and PINs with Secure Sockets Layer encryption are still the way to go. But tokens and smart cards may make sense in large business-to-business applications where pre-existing relationships and signed contracts are in place, says Smith, who's also chief technology officer at San Jose-based Secure Computing Corp.

Christiansen says tokens and smart cards will make up the bulk of advanced authentication for the next five years because they're more portable — via Universal Serial Bus (USB) plug-ins and network cards — and less expensive at 25 cents to $60 per user. Biometric devices and software, which start at about $100 per user, require external hardware readers or cameras that are difficult to carry around.

Potential Drawbacks

But there are drawbacks with tokens and smart cards, say analysts and users. Mainly, their contents aren't automatically encrypted over the wire. And users can break, damage or lose them.

Breakage was the reason OppenheimerFunds Inc. in New York recently scrapped a 2,500-user token installation. "The calls for help with broken tokens or dead batteries took two full-time administrators. It was a management nightmare," says Mike Hager, vice president of network security and disaster recovery.

Before selecting a token to authenticate users for its PeopleSoft resources, Predictive Systems Inc., a New York-based IT consulting firm, ran the tokens through a gantlet — banging them, stepping on them, dropping them in coffee. The company settled on USB plug-in tokens from Aladdin Knowledge Systems Ltd. in Chicago. "You could actually dry off the coffee, and they still worked," says Predictive CTO Anish Bhimani.

Unlike Predictive, Los Angeles-based law firm Allen Matkins Leck Gamble & Mallory LLP needed device-independent tokens because the firm's 250 attorneys didn't want to lug around heavy documents and laptops. Instead, they wanted network access from any machine at any location, including computers at law libraries, courts and even competing law firms, says Tony Bothwell, systems administrator at the firm.

He issued SafeWord Silver 2000 tokens, a key-chain token from Secure Computing, in late 2000. Now, he says, attorneys can log on to the Web site and push a button on their tokens that pops up a number on the LED screen. This becomes their password into the corporate network. The encrypted number, which seems random, is actually synchronized with Secure Computing's PremierAccess security server.

However, because complex memorized passwords aren't convenient for everyone, biometrics are becoming the substitute of choice for users. But Smith and analysts say biometrics will remain a secondary form of authentication — primarily inside the network — because of privacy concerns, cost, bulky hardware and the possibility of false readings.

Convenience is what drove the Florida Supreme Court system in November to begin replacing passwords with Compaq Computer Corp. fingerprint readers and BioLogon software from Identix Inc. in Los Gatos, Calif. The project covers 650 desktops at a cost of about $120 per user.

"In our trial courts, some of our judges have to make case rulings every hour. And in the Supreme Court, our justices spend a lot of time in research," says Alan Neubauer, a senior network support analyst for the court system. "[Judges] can't be bogged down trying to remember 'Now what was that 20-character password I was supposed to remember this month?' "

Concerns about privacy were Neubauer's first hurdle during the program's pilot.

"Half the judges had this preconceived notion that their fingerprints are floating out on the Internet," he says. But the Identix BioLogon software transmits and stores only a mathematical grid of points on the fingerprint, not the print itself. It's also encrypted in transit and in storage.

Interestingly, concerns about privacy never arose among teachers and parents of children involved in the Stockholm pilot, says Hamouni. Instead, his problem was finding a fingerprint reader that could recognize child-size fingerprints. Saflink's, he says, was the only one that could.

Users advise to check the stability of biometric vendors carefully before buying products. Neubauer, for example, started with five vendors, but during trials, three of them dropped out of the market.

There are many other authentication types moving into the market, such as keyboard behavior-recognition software from Authentor Systems Inc. in Englewood Colo., and IP-address and hardware identity systems from Safewww Inc. in Unioodale, N.Y.

But for Web-based access, passwords still rule, according to John Pescatore, security research director at Gartner Inc. in Stamford, Conn.

"Less than 0.5% of Internet transactions today are using anything stronger than a password. We feel passwords will be king through the year 2003," Pescatore says.

But password administration presents management problems — including lost passwords, password resets and user account management — that aren't easily solved. Nor are users likely to memorize alphanumeric character strings that are reset monthly. And that means they will circumvent security, Smith says, defeating the purpose.

For these reasons, Hamouni thinks passwords are already dead. But he warns against buying any new authentication system because of its "cool" factor, particularly with so many vendors entering and leaving the market.

"Before you change your authentication infrastructure, you need to figure out what you will use it for and then tailor it to fit the user," advises Hamouni. "Work with your vendors. And don't rush it."

Integration Challenges

THE PROBLEM: Integrating back-end directory services with authentications schemes isn't always easy.

Alan Neubauer, senior network support analyst for the Florida Supreme Court system, ran into integration problems between the court's directory in the Novell Modular Authentication System (NMAS) and fingerprint software from Identix Inc. in Los Gatos, Calif.

Even after adding other Novell Inc. software, like a certificate server and an international cryptology infrastructure, he couldn't get the application to run smoothly, Neubauer says.

At Novell's recommendation, he upgraded to a more feature-rich NMAS 2.0 and woke to a gaping security hole. "You log on using the fingerprint reader. Log off. Then log back on again. All you have to do is wait three minutes [and] 40 seconds, and it will reauthenticate you without you ever having to put your finger on the reader," he explains.

Gabrial Waters, Novell's access and security products manager, says the security problem was related to Neubauer's screen-saver program. Neubauer says Novell had a patch for the problem before he upgraded, but Novell failed to tell him in advance.

ONE SOLUTION: Try a different directory service.

The glitch was enough to get Neubauer to test the Identix application on a competing directory service: Microsoft Corp.'s Active Directory (AD). "[Identix] ran flawlessly," he says. So now he's replacing 12 NMAS servers with Active Directory servers and hopes to go live in March.

A DIFFERENT VIEW: Each integration project has its own challenges, depending on the software involved.

Samir Hamouni, manager of the biometrics project for the city of Stockholm, says he had no such problems linking his Saflink Corp. fingerprint application to NMAS. He adds that AD would never be able to scale to the size of his enterprise. "Novell has everything we need in the NMAS 2.1 software module. The installation went fast. What took time was scanning all the fingerprints into the system," he says.

– Deborah Radcliff

Online Exclusive

Safe and Secure

Network security specialists are finding that their hot skills offer career comfort. By Sharon Watson

DWAYNE MOEHL, project director of enterprise systems at Northwestern Memorial Hospital in Chicago, needs two good network security professionals for the 720-bed facility.

In addition to securing the hospital network from the IP layer to the end user, Moehl must comply with federal health care privacy regulations that are long on requirements for protecting patient data but short on system specifics. And in the post-Sept. 11 environment, he's trying to safeguard the hospital's complex network with increased automation.

It's a job Moehl can't do alone, even with the security knowledge he's gained by creating network architectures.

"What I do know is, there's a lot of stuff I don't know," he says. In addition, Moehl says, new security techniques and risks seem to surface every week.

That's why Northwestern, with 167 IT professionals on staff, is adding an executive security management position, as well as a hands-on network security post. The hospital isn't alone in seeking network security expertise: Many companies, especially those involved in e-commerce or regulated by the federal government, have been making network security an IT priority in the past year. And because there's an insufficient supply of skilled professionals to meet the growing demand, network security is emerging as IT's next hot job market.

A Fertile Field

"One of the broadest gaps between supply and demand is in security," says David Foote, a *Computerworld* columnist and president and chief research officer at Foote Partners LLC, an IT workforce research and consulting firm in New Canaan, Conn. "Demand is particularly rapid for people who can walk and talk security as well as business issues."

Descriptions and titles for network security positions are still in flux. In general, responsibilities of security administrators and analysts include creating network security policies and procedures and implementing and overseeing tools to support them. Salaries for these jobs range from $75,000 to $100,000, assuming a minimum of three to five years of experience.

DWAYNE MOEHL needs network security professionals to help Northwestern Memorial Hospital comply with federal health care privacy regulations.

Engineer/architect positions are more technical and may encompass creating secure networks, plus building firewalls, implementing intrusion-detection systems, handling incident response and performing some management responsibilities. Salaries for these positions range from $85,000 to $140,000, depending on industry, geographic region and the demands of the job, says Tracy Lenzner, president of Lenzner Group, an IT security recruiting firm in Las Vegas.

Because understanding TCP/IP is critical to many security functions, network professionals have an advantage in entering the security arena. But networking skills alone won't win jobs. "Security is another level of skills and knowledge you must put on a seasoned networking background," says Moehl.

For example, network security professionals must first understand how applications perform at the packet level and then learn to recognize minor anomalies in packet size or order that signal an attack, says Jonathan Taylor, an enterprise security engineer at Sutter Health, a Sacramento, Calif.-based nonprofit health care network that serves more than 100 communities.

Also, employers demand candidates with practical security experience, say recruiters. Network security professionals and recruiters recommend getting this experience by working on security projects employers already have under way. Taylor says he got involved with security through a network engineering project and "fell in love with it."

Sold on Certification

Taylor and other professionals also add to their skills by attending security conferences, scouring security bulletin boards and books, and enrolling in security education and certification programs. The two certifications most in demand among employers are the Certified Information Systems Security Professional (CISSP) from the International Information Systems Security Certification Consortium Inc. in Framingham, Mass., and Global Information Assurance Certification (GIAC), which is offered by the SANS Institute in Bethesda, Md.

Such certifications often yield bonus pay, says Foote. His research through the third quarter of last year shows that the median bonus for CISSP-certified network security professionals was 8% of base pay; the median bonus for GIAC-certified professionals was 5% to 12% of base pay.

As security is growing in importance, it's also getting more funding. "I'm hearing it's easier to get security budget dollars these days," says Todd Furney, manager of systems and network security at the Chicago Board Options Exchange.

That doesn't mean network security is being handed a blank check. "A big part of your job is selling security to management," says Furney. He and others emphasize that good communication skills and business knowledge are necessary to succeed in either specialized security niches or on security management career tracks. ◗

Watson is a freelance writer in Chicago.

Do's and Don'ts

DO look for security jobs in industries that must comply with privacy regulations, such as banking and health care. The more specific your business knowledge of these industries and the regulations they face, the more valuable you are, say recruiters.

DO consider gaining security skills for wireless networks and devices. "Wireless is going to be a tremendous area," says Tracy Lenzner, president of Lenzner Group. She and other recruiters say they expect that market to heat up this year.

DO build your soft and business skills for more options along a security career path. Network security professionals say they must be able to show management how security measures fit into a company's business plan.

DON'T expect security courses and certifications to substitute for hands-on, practical network security experience. Instead, lend your networking expertise to security projects within your company to gain experience.

DON'T become a criminal hacker, or "black hat," thinking you'll parlay that experience into a corporate job. "You'll permanently damage your career," warns Jonathan Taylor, an enterprise security engineer at Sutter Health.

– Sharon Watson

NICHOLAS PETRELEY

Petreley's Law Of Sysadmins

THREE AXIOMS will drive the future of enterprise networking: Moore's Law, Metcalfe's Law and Petreley's Law, which I will define for the first time here.

Gordon Moore, co-founder of Intel, originally stated in 1965 that the number of transistors per square inch in integrated circuits would double every year. It turned out to be more like every 18 months in practice, and Moore blessed a revision of his law to adapt to reality.

Ethernet inventor Bob Metcalfe stated in his law that the usefulness of a network increases at a rate in proportion to the square of the number of users on that network.

I would like to propose a new law to complement these others: The security of any corporate network is inversely proportional to the number of systems administrators on the network.

OPINION

Metcalfe's Law trumped Moore's Law in importance the moment that companies connected to the Internet. One could see evidence of this as users stopped screaming for more powerful PCs and instead started demanding more bandwidth.

That doesn't mean Moore's Law is no longer relevant. If you restate Moore's Law as "Processing power is cheap, and it keeps getting cheaper," Moore's Law still has a very important part to play, even if users no longer care as much about the speed of the main CPUs on their desktops.

One way to address security is to encrypt information before you pass it to the network. We normally associate encryption with a performance hit because it's CPU-intensive, but Moore's Law allows us to do encryption in network interface card hardware at decreasing costs. As processing power continues to get cheaper, network interface card vendors have added hardware-assisted IPSec encryption as a checklist item.

The problem is that many of you are probably taking advantage of these features only if your company has implemented virtual private networks (VPN). But there's no reason why anyone should be sending plain-text information, let alone plain-text passwords, over the Internet anymore. Encryption needs to graduate from VPNs and Secure Sockets Layer-enabled Web sites and become the standard for communications over the Internet.

I would also like to see automatically negotiated data compression protocols become part of Internet communications standards. That would make hardware-assisted data compression eventually become a checklist item for future network interface cards. In many cases, this could increase data throughput and therefore result in a perceived increase in bandwidth, regardless of your physical connection to the Internet. It may be a hard sell to get someone to buy a computer because the CPU runs 100 MHz faster, but it would be easy to sell anything that increased perceived bandwidth (hint, hint, Intel and 3Com, to name but two network interface card vendors).

One company that seems to have a clue in this regard is SSH Communications Security in Palo Alto, Calif. It has several products and proposals that combine compression with the IPSec protocol in both hardware and software. SSH also has other interesting technologies, such as one that lets you use IPSec along with network address translation (NAT). NAT is a technique that lets you connect several clients on your network to the Internet simultaneously without having to give each of them its own public IP address. IPSec doesn't currently support NAT, but SSH has managed to add the capability without violating the IPSec standard.

Now to throw the monkey wrench into the works: Petreley's Law. Stated again, the security of any corporate network is inversely proportional to the number of systems administrators on the network. The crucial question, therefore, is how many systems administrators does your company have? Care to take a guess? Three? Ten? Fifty?

Bzzzt. If you work at a large company that puts a Windows PC in the hands of every user, then you have thousands of systems administrators. Windows still gives user applications write access to system files, which means any user who accidentally downloads a virus or Trojan horse provides the malicious program with systems administrator privileges.

This isn't the case with most other operating systems, including Linux, BSD, Solaris and other Unix variants. In Unix, a user is a user and any program he runs can have only the privileges that are assigned to him. Think about that when you make plans to lock down security for your enterprise network.

IP-based VPNs

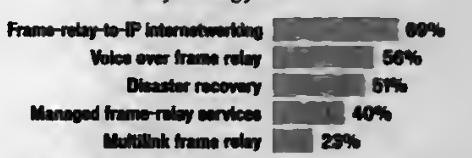
Considering an IP-based VPN? Here's an analysis of the top-tier vendors:

Company	Current rating	Tier	Status	Momentum	Vision
AT&T	Positive	1st	Established	Positive	Neutral/Positive
Broadwing	Neutral/Positive	2nd	Established	Neutral/Positive	Neutral/Positive
IPivot	Positive	2nd	Emerging	Positive	Positive
Qwest	Positive	2nd	Established	Positive	Positive
Sprint	Neutral	1st	Established	Neutral	Neutral
WorldCom	Very positive	1st	Emerging	Very positive	Very positive

SOURCE: CURRENT ANALYSIS INC. (WWW.CURRENTANALYSIS.COM), STERLING, VA., JANUARY 2002

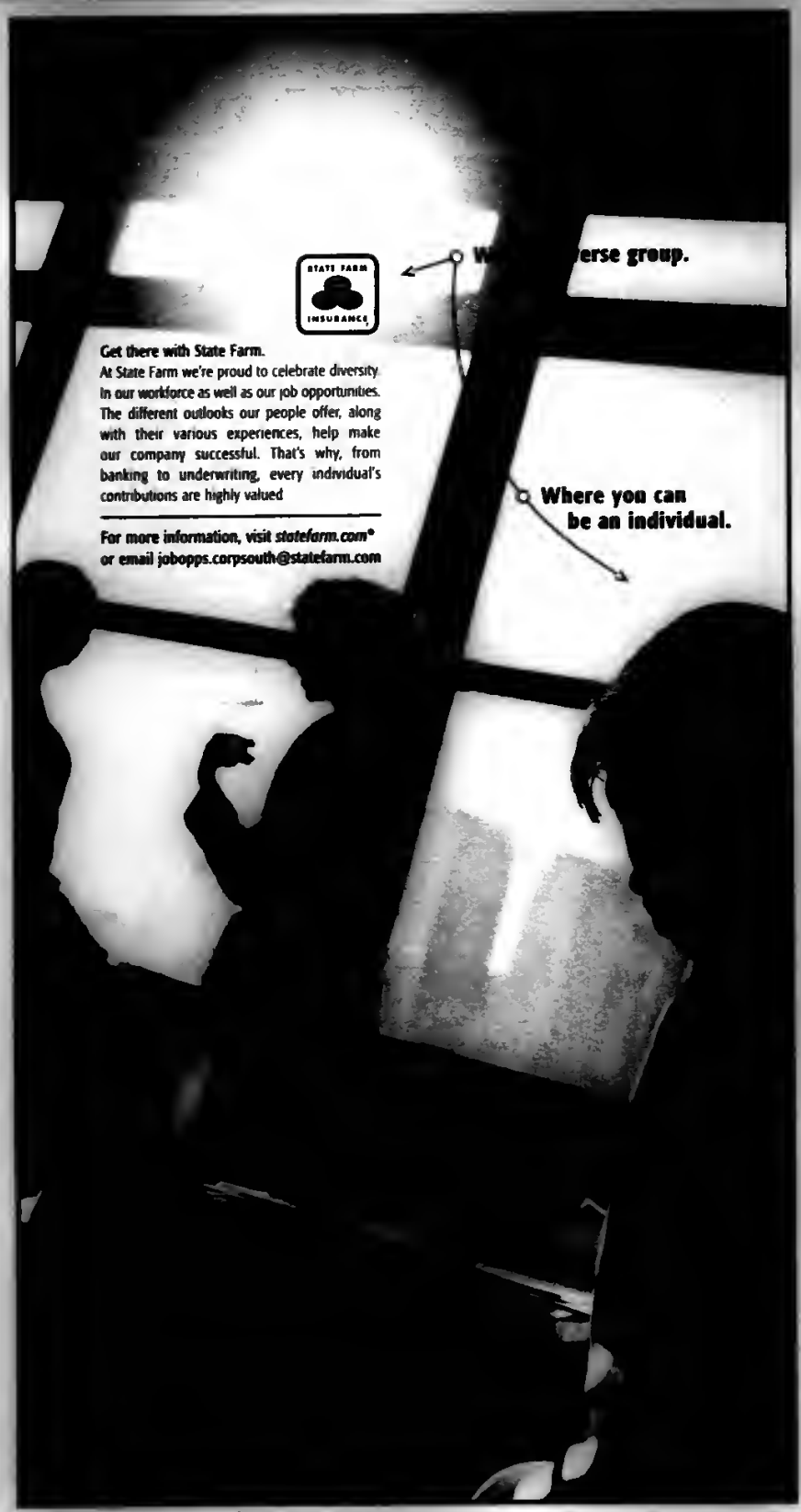
Favorite Features

Frame-relay users say they use — or plan to use — the following features:



Base: 60 U.S. frame-relay users; multiple responses allowed

SOURCE: IDC, FRAMINGHAM, MASS., NOVEMBER 2001



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DIVERSITY IN IT CAREERS

Advertising Supplement

Diversity in the IT Field

By Jennifer Hicks

IMDIVERSITY.com

Diversity in the information technology industry is nowhere close to where it needs to be. Harris N. Miller, president of the Information Technology Association of America spoke before the U.S. House Committee in March of 2000. The statistics he cited were alarming:

- African Americans represented 5.4 percent of all computer programmers and 7.1 percent of computer systems analysts—two of the core jobs in the industry
- Hispanic Americans held 4.6 and 2.5 percent of these jobs, respectively.
- Native Americans represented only .2 percent of the total science and engineering labor force, yet they represent .7 percent of the total U.S. population.

In 2001, not too much changed. Although there were a significant number of African Americans in IT, "not that many have arrived at positions of power and decision-making," says Renee McClure, national president of Black Data Processing Associates.

And, with the recent stumbling economy, there's been a 44 percent drop in demand for IT workers in the U.S., according to the Information Technology Association of America.

The Information Technology Industry Defined

In its narrowest sense, the information technology industry is defined as those organizations concerned with furthering computer science and technology, design, development, installation, and implementation of information systems and applications. Yet professionals versed in any of those areas fit into every spectrum of the economy. And, because of this, even given the economic downturn, there are still some jobs where IT professionals are in great demand.

Computer Systems Analysts, Engineers, and Scientists

The need for systems analysts, engineers, and computer scientists is acute. In fact, this group ranks among the top 20 in the number of new jobs created through 2008, according to the 2000-2001 edition of the Occupational Outlook Handbook (OOH). While found in every sector of the economy, many computer analysts, engineers, and scientists are concentrated in the computer and data processing services industries—either as employees or independent contractors.

Programmers

There are two broad types of programmers—those who deal with systems and those who deal with applications. Employment of programmers is expected to grow between 21 percent and 35 percent through 2008, according to the OOH. Although programmers are found in every industry, the largest concentration is in the computer and data processing services industry.

Opportunity for Advancement

For seasoned IT professionals, promotions can be difficult—unless your employer provides training opportunities. Technology changes rapidly and unless one has up-to-date skills and training, moving up the corporate ladder can be impossible. Those organizations that provide access to training—and thus "grow their own" IT pros—are also more likely to make career advancement possible within their organizations.

Perceptions of Those in the Field

A 2001 survey by the Information Technology Association of America, *IT Magazine*, and *U.S. Black Engineer* found that the primary reason people entered the IT field was for training opportunities and professional development, followed by salary and benefits.

African Americans were the primary respondents (78 percent) to the survey, followed by white Americans (10 percent). Asian Americans (7 percent), Hispanic Americans (3 percent) and Native Americans (1 percent). Fifty-five percent of the respondents were men and 45 percent were women.

Men cited early exposure to the industry as the reason for entering; women cited prior work experience. The report surmised that we should "be mindful of how young persons in target populations encounter technology" and that we could face serious consequence if we don't introduce girls to technology at the same rate we do boys. Many respondents also said they believed many women and minorities were not aware of opportunities within the industry and suggested that more internships and mentoring could help raise awareness and interest.

Author bio:

Jennifer Hicks, author of several hundred articles and who lives in the Boston area, is the director of online content for IMDiversity.com http://www.imdiversity.com, the Web site where opportunities, careers, and diversity connect.

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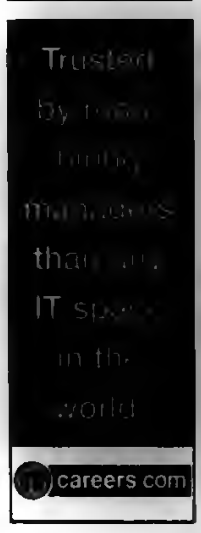

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F/T Software Engineer Responsible for creating Functional Specification documents based on design requests & producing & implementing High Level Designs for assigned functional areas. Perform Unit Testing on developed codes & troubleshoot defects found. Design & implement new modules in client server & Java environment & maintain server modules written in C. Provide technical support to clients, evaluate business requirements & develop software & documentation according to established standards using Centura w/ embedded SQL, Cobol SQL, UNIX, Unix Shell Scripts & ORACLE. Must have Bachelor's degree in Computer Science or related field. Foreign degree equivalent accepted. Must have 3 yrs. exp. in job offered or position w/ same duties. Salary: $64K. Send resume: Betsy Moya, Sema, 701 Waterford Way, Suite 300, Miami, FL 33126

5 openings available for a Programmer Analyst to plan, develop, test, Program, debug computer programs using various computer languages. Evaluates user request for new or modified program and analyzes, reviews and alters program to increase operating efficiency or adapt new requirement, and write documentation to describe program development, logic, coding, and Corrections. Bachelor Degree or its equivalence and two years experience in Computer programming. Salary $73,424.00. Send resume to Aptech Professional Solutions, Inc., 300 West Washington Street, Suite 1408, Chicago, IL 60606

Programmer Analyst (2 positions) - Plans, develops, tests and documents computer programs, applying knowledge of programming techniques and computer systems. Design and implement computer based management system using C++, Rational Rose, Java and UML on both UNIX and Windows NT systems. Requires Bachelor in Computer Science, Engineering or Mathematics. Must have 3 years exp in the job offered or 3 years exp as a Software Engineer, Systems Engineer or Systems Analyst. Must have 1 yr exp using C++, Java, Rational Rose and UML on both Unix and Windows NT systems. 5 day, 40 hr/wk, $75,000/yr. Please mail resumes to: Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to order number CO5010412.

Business Systems Analyst: (Libertyville, IL) Configure business systems software, analyze business processes; design, develop and implement SAP's SD, PP, MM & Logistics modules; perform scripting exercises; designs and configure the ERP system; design and configure Financial Business System software; design reports, forms, interfaces, custom programs and conversions; lead projects, execute system unit and integration testing including testing, configuration and error resolution; provide user training; identify business processes and system tasks to be documented.

Bachelor's degree in Mechanical Engineering or Computer Science required. One year experience in the position or one year as an SAP Consultant and/or Senior Engineer-Manufacturing required. Experience in related occupation must include the design, development and implementation of SAP's SD, PP, MM and Logistics modules.

40 hrs./wk., 8:00a.m. - 5:00p.m., $70,000/year.

Applicants must show proof of legal authority to work, including those with temporary work authorization.

Send 2 copies of both resume and cover letter to: Illinois Department of Employment Security, 401 South State Street - 7 North, Chicago, Illinois 60605. Attention: Lelia Jackson, Reference Number V-IL-27241-J. AN EMPLOYER PAID AD. NO CALLS

Programmer. Responsible for designing, coding and testing software, also responsible for programming by using C/C++ and JAVA language, developing new web-enabled customer service tracking system for international trade and service, modifying, updating and upgrading company's database, preparing unit testing and system testing documents as well as system maintenance. Salary: 45,000/yr, 40 hr/wk, 8:30 am-5:00 pm. Applicants must have completed grade & high schools, 4 years of college education with bachelor degree in computer science or relevant field and at least one year working experience for the job offered plus one year experience for the related occupation of system analyst. Applicants must show proof of legal authority to work in the U.S. Send resume to Illinois Department of Employment Security, 401 South State Street - 7 North, Chicago, IL 60605. Attention: Sheila Lindsey, Reference #V-IL 29632 - L. An Employer Paid Ad. No calls - send 2 copies of both resume & cover letter.

Java Programmer Analyst. Provide technical computer support and user assistance in developing, operating, and maintaining all web application programs for all divisions of Morley Companies, Inc., maintain existing web applications, and prepare program documentation. Must have Bachelor's degree in Computer Science or related and knowledge of AS400 platform, Web Sphere Application Server and HTTP server for IBM, EJB, Java, JSP and Java script. Send resume with cover letter to Morley Companies, Inc., Attn: Richard Mott, One Morley Plaza, Saginaw, Michigan 48603.

Engineering Systems Analyst wanted by Cimnet in Downers Grove. Supervise software quality assurance product testing, train customers on systems operation; perform sample analyses of customer production work flow processes; perform analysis of customer systems data, develop, write and maintain technical documentation. Must have BA in Engg. or its equiv. & 5 yrs exp in sys. analysis in the elec. manuf. indus. Respond to: HR Dept. 2651 Warrenville Road, Downers Grove, IL 60515

Network Engineer wanted by DePaul in Chicago. Plan and design state of the art academic network facilities; provide and interface with mainframe systems ensuring appropriate access and security systems in-place; coordinate the development of remote access environment; prepare technical documentation on computer and office hardware/software; develop/maintain schedules and ensure proper maintenance of staff computing resources. Must have MS in Compt. Sci. or equiv. & 6 mon. exp & Microsoft certified sys. Engineer. Respond to: HR Dept. DePaul University, 1 E. Jackson, Chicago, IL 60604

Systems Analyst - IS/IT Prof Consltng Svcs Co. in Piscataway NJ. Masters degree in Comp. Sc., MIS, Engg. and 1 yr. exp reqd. Respond by resume to (Ref: #GG7503) Subex Technologies, Inc., 255 Old New Brunswick Road, S240, Piscataway, NJ 08854 (no phone calls)

Software Engineer (Piscataway, NJ) - Design, develop, test and administer software including Unix, ServiceGuard, HP-IT/O, NNM, Trusted Systems, Oracle, Informix, C; and write, debug and implement code. 40hrs/wk, 9am-5pm $60000/yr. Min: Bachelors Degree in Computer Science/Engineering. Send resume to: Prosario Systems, Inc., 143 Olive St, Piscataway, NJ 08854

Technician needed to configure build & stage computerized surveillance network sys., video imaging process & intrusion detection sys. for financial institutions including VIP 8.0 Plan, install, troubleshoot & support LAN hardware, software & apps in various operating sys. Plan & develop IT sys. to enhance effective use of hardware & network sys including Cisco networks & routers. Build advanced servers & PCs based on company specifications. Use WinNT, Win2000 Pro & Window 2000 Servers. BS in comp. sci. or equiv. Send cov. letter/res to Pradeep Kanungo, Operational Manager, CT&T Distributions, Inc., 3 Kellogg Ct., Unit 2, Edison, NJ 08817

Quality Assurance Team Leader- Req. B.S. Comp. Sci., Eng., or related field & exp. in Manual Testing in the internet Environment. Sr. Technical Manager- Req: B.S. Eng & exp in heavy supply chain management execution, sigma consulting, Mercator & sterling. Also seeking qualified individuals for Senior Software Engineer and Quality Assurance Team Leader openings. Apply to: Eventra, Inc. Attn: HR Dept, 440 Wheelers Farms Rd. Milford, CT 06460

Sr. Software Engineer lead integration proj. with strong knowledge in Java, Corba, Ada, BizTalk, assembly, memory mgmt. M.S. in Comp. Sci. plus 2 yr exp. Send resume to HR, Integrated Solutions, 110 Wall St, Fl 7, NY, NY 10005.

Systems Analyst - IS/IT Prof. Consltng Svcs. Co. in Piscataway, NJ. Masters degree in Comp. Sc., Engg. and 6 mo. exp. reqd. Proficiency with RDBMS, C, C++, Visual Basic. Respond by resume to: (Ref. #GG7432), Sutex Technologies, Inc., 255 Old New Brunswick Road, S240, Piscataway, NJ 08854 (no phone calls)

General Manager, Director International Sales. Directs int'l sales/mktg. of computer components and executives/administrative personnel, obtains competitive position in industry throughout S. America/Europe/ U.S., allocates budgets; evaluates sales reports, communicates in Spanish/Portuguese/ French with foreign distributors/ buyers. Job in FL. Req. 4yrs. exp. Resume to Doron Miller at Computech International, 825 Northern Blvd., Suite #102, Great Neck, NY 11021. No calls.

F/T Software Engineer. Responsible for creating Functional Specification documents based on design requests & producing & implementing High Level Designs for assigned functional areas. Perform Unit Testing on developed codes & troubleshoot defects found. Design & implement new modules in client server environment & maintain server modules. Provide technical support to clients, evaluate business requirements & develop software & documentation according to established standards using PowerBuilder 7.0/PFC client & Sybase ASE, Sybase SQL, & Oracle 8i. Must have Bachelor's degree in Computer Science or related field. Must have 6 mos. exp. in job offered or position w/ same duties. Salary: $62,920. Send resume to Betsy Moya, Sema, 701 Waterford Way, Suite 300, Miami, Florida 33126.

IT Project Manager needed to manage IT infrastructure, research software apps, supervise tech staff and manage implementation of new apps, including database admin. and version upgrades in Windows 2000/NT and Unix, Oracle, MS Office and Quickbooks, MS Exchange, TCP/IP, networking, LAN, T1, DSL, IIS, Firewall, Clustering, among others. Must have BS in Comp. Sci. or Eng. or related discipline +5 yrs relevant exp. Reply to: S. Namant, 4365 Rte. 1 South, Suite 110, Princeton, NJ 08540.

SYST ANALYST for IT consulting co to design & dev application software for marine shipping & transportation industry; 35 hrs/ wk. Must have Master's deg in comp sci, MIS, elec engrg or math & 2 yrs in job or 2 yrs software engineer exp. Contact Trade Ship, Inc., HR Dept., 201 Old Country Rd. Ste 202, Melville, NY 11747.

Senior Software Engineering positions available for qualified candidates possessing BS or equivalent and 4 yrs. relevant work experience. Work with 2 of the following: ERP, BPCS, CL/400, SQL/400, AS/SET and RPG. Please mail resume to VeryFine Products, Inc., Attn: HR, 20 Harvard Rd., Littleton, MA 01460. EEO/AAP

Sr. Technical Consultant - IS/IT Prof. Consltng Svcs. Co. in Piscataway, NJ. Masters degree in Comp. Sc., Engg. and 1 yr exp. reqd. Proficiency with RDBMS, C, C++, Centura. Respond by resume to: (Ref. #GG7456), Sutex Technologies, Inc., 255 Old New Brunswick Road, S240, Piscataway, NJ 08854 (no phone calls).

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F/T Database Consultant. Responsible identifying business requirements related to the implementation of company's software solutions, compare business requirements of company's software capabilities, determine enhancements, create functional design specifications & providing change management guidance to clients. Develop testing strategies, plans. Analyze computer codes to determine database population & defects. Establish hardware & system software environments & create technical design specifications for software enhancements. Determine conversion strategies & plans & provide technical support. Work w/ VMS, Visual Basic, Access, COBOL, FoxPro & SQL. Must have Bachelor's degree in CS, Systems Engin or related field. Foreign degree equivalent accepted. Must have 2 yrs. exp. in job offered or position w/ same duties. Salary $57,165. Send resume Betsy Moya, Sema, 701 Waterford Way, Suite 300, Miami, FL 33126

F/T Software Engineer. Responsible for creating Functional Specification documents based on design requests & producing & implementing High Level Designs for assigned functional areas. Perform Unit Testing on developed codes & troubleshoot defects found. Provide technical support to clients, evaluate business requirements & develop software & documentation according to established standards using Centura w/ embedded SQL, PL/SQL, Java, JavaScript, Java Swing, Java RMI, CORBA, SUN RPC, Solaris 2.x, & SunOS. Must have Bachelor's degree in Computer Science or related field. Employer will accept a Master's degree in lieu of Bachelor's. Must have 2 yrs. exp. in job offered or position w/ same duties. Salary $64,000. Send resume w/ Betsy Moya, Sema, 701 Waterford Way, Suite 300, Miami, Florida 33126

Sr. Technical Support Analyst wanted by Independence Blue Cross in Philadelphia to develop software req's for major business info systems using Javascript & COTS GA/BS (or equiv) req'd + 2 yrs relevant exp. Fax resume to G. Crawley 215-241-2068.

Systems Supervisor

Baptist Health Systems is currently seeking a Systems Supervisor to supervise the network server design, implementation and support processes. This position requires a BS/BA degree and 7 or more years of relevant IT experience. An in-depth working knowledge of Client/Server, Internet/Intranet technology and an advanced working knowledge of multiple of the following Oses: Netware,Unix, 95/NT, Win2000 in required. The candidate we seek must have strong networking concepts and LAN/Wan design skills. Health care environment knowledge and programming/scripting skills are desirable. MCSE, MCNE, Sun competency or CCNA certification is preferred. 3 or more years experience in a project management/planning capacity is required.

Please apply via fax to: 305-662-2758, Attn: Hilda Fuentes, Professional Recruiter, Human Resources Department. We are an equal opportunity employer and a drug-free workplace. www.baptisthealth.net

Baptist Health Systems of South Florida

Engineer II. Analyze & produce basic product designs/engineering data as defined by product specs for avionics products such as software and control instruments and displays for cockpit-man-machine interfaces; create software program design using Ada programming, object-oriented design methods, & Rational Rose software tools in a UNIX based Rational Apex environment using with the Virtual Prototypes Vaps tool on a Windows NT system; develop high and low level software interfaces with hardware for the ARINC 429, ARINC 708, and MIL-STD-1553B protocols, interface with hardware including the Pentevis 3 graphics board, PowerPC 8,03 processor, Mini ACE MIL-STD-1553B chip and compact PCI bus; determine feasibility of design w/ constraints; test for conformance with specs; provide in-depth engineering support. Prerequisites: Bach. degree in engineering or related field, plus at least 2 yrs of exp. in job offered OR 2 yrs of exp. in design/development of software. Competitive salary. Job Location: Duluth, Georgia. Susto resume to Ms. Margie Ramer, AT TN DOL AD-1, BarcoView LLC, 3059 Premiere Parkway, Duluth, GA 30097-4905

Application Developers, VA Beach, VA Software (Reynolds DMS & automotive products) apps design & object oriented development using Java C#, Oracle, Visual Interdev, VB, VC++, & ASP/IIS 5.0. Req. BS in computer science, engineering, or a related field and 2 years experience as a programmer, developer or analyst. Resumes to: K. Cramer Reynolds & Reynolds, Box 2608, Dayton, OH 45401

Full-time Architect. Responsible for providing technical support for database administration & for updating Oracle databases & installation of new code path policies working w/ C, C++, Unix HP Sun0s, Oracle, OLE Java, PL/SQL, UML, Visual Basic & ASP. Assist in developing databases for translation purposes & creating new applications or initiate new product releases to customers & database tables. Develop testing strategies, plans, conditions & analyze codes to determine database population & defects in customer's telecommunications billing software. Install & assist w/ upgrades for in-house translation tools, provide support for translation issues & create functional design specifications for software enhancement. Must have Bachelor's degree in Computer Science or related field. Foreign degree equivalent accepted. Must have 2 yrs. exp. in job offered or position w/ same duties. Salary $70K. Send resume: Betsy Moya, Sema, 701 Waterford Way, Ste 300, Miami, FL 33126.

Engineer

Pitney Bowes, Inc. has an opening in its Shelton, Connecticut office for an Engineer.

Support senior personnel investigating internet security threats and countermeasures and determine how new product concepts should be designed in order to achieve required security levels. Support the creation and evaluation of new internet and network product concepts. Participate in technology investigations, including secure coprocessors, biometrics, formal methods, design methodology for secure systems, power signature analysis, virtual private networks and classical cryptographic algorithms.

Must possess at least a bachelor's or its Equivalent in Computer Science, Electrical Engineering or a related field. Classroom Training or experience with algorithm analysis, scientific computing and advanced numerical analysis programming using Matlab and Maple math background in field and number theory, assembly language programming and knowledge of UNIX and UNIX administration is required.

Resume and/or cover letter must reflect each requirement above and specify reference code E1 or it will be rejected.

Forward resume to Robbin Drew Elliott, Pitney Bowes Inc. One Elmcroft Road, Stamford, CT 06926-0700.

Quality Analyst, Bohemia, NY. Exercise authority in QA matters that affect product or service quality. Verify validate & analyze production work. Audit the website connectivity of production sites. Verify, validate & analyze product design & functionality according to documented instructions, including new building, testing. Compose and/or update test scripts, test plans, work instructions, forms, & other documentation. Administer QA test websites. Upgrade & maintain third party software used by QA, including browsers, antiviral software, operating systems, file-sharing software & server management programs. Document all defects, problems or opportunities for improvement. Work with Account Management group to provide technical support. Bachelor's degree or equivalent in Information Systems or Computer Science & 2 yrs exp. in IBM PC's, Windows, & commercial automated software tools such as Winrunner & in web and/or software testing such as unit tests, integration tests & regression tests. Alternatively, the employer will accept a qualified applicant with 4 yrs exp in the position offered or in related systems analysis position & yrs exp must include exp in IBM PC's Windows, & commercial automated software tools such as Winrunner & in web and/or software testing such as unit tests, integration tests & regression tests. Send resume to Karen Parente Direct Insite, 60 Orville Dr. Bohemia, NY 11716.

Systems Analyst

Pitney Bowes has an opening in its Stamford, Connecticut office for a Systems Analyst.

Responsible for the successful design, development, implementation, support and troubleshooting of the Company's major business computer applications including billing and invoice generation. Work with end-users to determine both the business requirements of these systems and how to interface these new systems with the Company's existing hardware and software. Oversee and coordinate related development, testing and implementation activities. Codes in COBOL, Easytrieve, JCL, Transform, SQL, IMS and DB2.

Must possess at least a bachelor's or its equivalent in Computer Science, Engineering, Math or a related field and relevant experience as a Programmer Analyst, as well as experience with the full software development lifecycle including heavy design and COBOL, Easytrieve, JCL, SQL, IMS, DB2 and Transform or a related system (i.e. SAS DC).

Resume and/or cover letter must reflect each requirement above and specify reference code SA or it will be rejected.

Forward resume to Robbin Drew Elliott, Pitney Bowes Inc. One Elmcroft Road, Stamford, CT 06926-0700.

Senior Oracle Database Administrator (Atlanta, Georgia) - Technical lead responsible for all aspects of Oracle database administration on Windows NT and UNIX, including stored procedure development, PL SQL coding, testing, tuning and physical implementation of production and development databases. Design systems, interfaces and data conversion projects conducted with company enterprise data architecture. Support production databases and interfaces for SAP administration, including financials and supply chain modules, custom enterprise software and web-based software. Will supervise other DBA's. Must have a Bachelor degree or equivalent in Computer Science or related field. Experience may have been obtained concurrently and must include (i) 5 years of experience in the job offered OR 5 years of experience as Oracle Database Administrator on Windows NT and UNIX, (ii) 5 years of experience each in PL SQL and production DBA support, (iii) 3 years of experience in SAP Basis Administration, and (iv) 1 year of experience each in Oracle 8i and data conversion. Must also be certified in Oracle Database Administration, UNIX Administration, and SAP Basis Administration. Must have legal authority or work in U.S. Send resume to Alison Read (REF SODA) 8751 Best Road, Suite 400, Atlanta, Georgia 30037

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Consulting

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Relational Database Management Systems
Risk Management Systems
Strategic Enterprise Management
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Web Development

All positions require some degree of travel as well as a Bachelor's Degree in a related field. Some positions require a Master's Degree.

Positions are available in Chicago and Downers Grove, IL; Cincinnati and Cleveland, OH; Austin, Dallas and Houston, TX; Boston, MA; Hartford and Stamford, CT; New York, NY; Chadds Ford, Philadelphia and Pittsburgh, PA; Detroit, MI; Minneapolis, MN; Washington, DC; Atlanta, GA; Kansas City, MO; East Brunswick, Jersey City and Parsippany, NJ; Charlotte, NC; Seattle WA; Foster City, Los Angeles, Orange County, Sacramento and San Francisco, CA.

Fax detailed resume to Job Code # ECNOVRCMPW at Deloitte Consulting L.P. Fax # 1-888-APPLYDT or email resume with Job Code to dcareers@deloitte.com. NO CALLS PLEASE.

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Senior Oracle Financial Technical Analyst. Serves as a financial technical analyst with specialty in Oracle Financials and Pro C based on UNIX and NT platforms for large multi-national insurance company; develop program specifications; provide program/system documentation, and assist in gathering information from the customers to be used in specific designs; assist in the selection of developing programs used for new or enhancing systems; participate in the analysis of customer system problems and conduct unit and integration testing. Design complex data structures in Oracle Financials or Pro C language; conduct program/system implementation and support the day-to-day operational environment. Sal:$60,000/yr.(overtime exempt), 37.5 hrs/wk., 8:30 am - 5:00 pm Mon-Fri. Requirements: B.S. degree in Computer Science or Engineering and 3 years exp. in job offered or as a Programmer/Analyst. 3 years exp. must include 2 years technical experience in "Oracle Financials" Pro-C, UNIX, Shell. Location: Chicago, IL Loop. Applicants must show proof of legal authority to work in the U.S. To apply send 2 copies of both resume and cover letter to: Illinois Dept. of Employment Security, 401 S. State St., 7 North, Chicago, IL 60605. Attn: Joanne Breaux, Reference #V-IL 30662-N An employer paid ad.

SOFTWARE APPLICATIONS DEVELOPER - Waukesha, Wisconsin Designs, prototypes, tests, codes and integrates multi-tiered software systems for global manufacturer of medical diagnostic imaging equipment. Works with cross-functional engineering teams to develop and implement software systems for one or more modalities such as magnetic resonance (MR) computed tomography (CT), positron emission tomography (PET) ultrasound, x-ray and/or other types of medical diagnostic equipment. Creates designs, documentation, and test plans during the entire software development lifecycle. Participates in post-production quality improvement while providing technical support to other engineers. Assists in modifying, enhancing, and maintaining existing software systems. Stays abreast of emerging technologies and recommends software system alternatives. Utilizes and incorporates Six Sigma methodology into the software development process whenever possible. Required is a Bachelor of Science degree in Computer Science, Information Technology or Engineering and two (2) years of experience in the position being offered or two (2) years of experience as a Software Engineer or Software Developer. As part of the required experience in the position being offered or in the related occupation, the applicant must have had experience in designing and developing software utilizing programming languages including C/C++ and Java, and web application servers including Netscape Enterprise Server and iPlanet; had experience working with NT and UNIX platforms; had experience with object oriented design methodology and with software aided case tools using Rational Rose/Visio; and had experience to the RDBMS design and development for Oracle/SQL Server. Must have proof of legal authority to work permanently in the United States. Please submit resume and cover letter to opportunities@gecareers.com and reference this job code in subject line of email: GEMS/286294/AN030. An Equal Opportunity Employer

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Software Engineer. Provide Microsoft Development technology services, system analyses and design, software product development, web development, turnkey software development, user training, and technical consulting in the areas of programming, analyzing, implementation, database administration and systems/network administration. Bachelor's Degree in CS or CIS plus two year experience in job offered or as a programmer. Must be proficient in VBScript, JavaScript, Visual Basic, DTS, and XML. $60,000/year. 40hr/wk. Must have proof of legal authority to work in the United States. Send your resume to the Iowa Workforce Center, 213 Watson Powell, Jr. Way, #100, Des Moines, IA 50309-1727. Please refer to Job Order IA1101515. Employer paid advertisement.

SOFTWARE ENGINEER to design, develop, test, implement and support n-tier application software in a client/server environment using Oracle PL/SQL, Visual Basic, SQL Server, Crystal Reports, Visual Source Safe, ASP, HTML, VB Script, Java Script, FTP and MS Access under Windows 95/98/NT, UNIX and Novell Netware operating systems. Require Bachelor's degree in Computer Science, an Engineering discipline, or a closely related field with four years of experience in the job offered. Extensive travel on assignments to various client sites within the U.S. is required. Competitive salary offered. Apply by resume to Juliette Moore, VP HR, Software Technical Services, Inc., 105 Nobel Court, Windward Business Center North, Alpharetta, GA 30005. Attn: Job GS.

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- Programmer/analyst: 2 yrs. programming exp. + BS in CS, eng or info sys. Need to operate independently, assess tradeoffs in design, evaluate & recommend 3rd party software/technologies & effectively communicate ideas.

Multiple locations throughout the US, will change to unanticipated locations as req. Send res to Recruiting Manager, PlanetPro Inc. 2993 Sunrise Blvd. St 107, Rancho Cordova, CA 95742. Legal right to work in the US must be stated

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Systems Analyst. Atlanta, GA. Develop unique solutions using ERDAS IMAGINE products. Use Remote Sensing/GIS techniques to develop software solns. Provide tech assistance & troubleshoot. Maintain & expand company's developer information website. Perform Aerial Photo Interpretation & Satellite Imaging manipulation. Provide consulting, using GIS/Remote Sensing skills as use, applications & integration of ERDAS products on site. Perform product testing & bug fix verification. Req. BS in Geog, CS or Earth Sci. and working knowledge, through academic coursework or experience, in Remote Sensing, Image Processing of GIS applications and C programming. Cos tact Jody Silverman, ERDAS, Ste 300 2801 Buford Highway NE Atlanta, GA 30329

SENIOR SOFTWARE ENGINEER to lead a team in the design, development, testing and implementation of application software using C, C++, Visual Basic, Oracle, Java, JSP, EJB, WebSphere, WebLogic, XML, EDI, COGEN, Informatica PowerMart and PeopleSoft under UNIX operating system. Supervise and mentor junior programmers and engineers. Require Bachelor's degree in Computer Science, an Engineering discipline, or a closely related field with five years of progressively responsible experience in the job offered, or as a Programmer/Analyst. Extensive travel on assignment to various client sites within the U.S. is required. Competitive salary offered. Send resume to: Priti Dani, H R Manager, Charter Global Services, Inc., 5445 Triangle Parkway, Suite 190, Norcross, GA 30092; Attn: Job HK.

SOFTWARE ENGINEER to design, develop, test, implement, maintain and support IBM mainframe business critical credit card application software using CICS, COBOL, VS-COBOL II, Easytrieve, DB2, JCL, TSO/ISPF, Xpediter, Oracle, HTML, JavaScript, ColdFusion and SQL Server on OS/390, MVS/ESA and Windows NT platforms. Require Bachelor's degree in Computer Science/Engineering, Business Administration, or a closely related field with five years of progressively responsible experience in the job offered or as a Programmer/Analyst. Competitive salary offered. Send resume to: Debra L. Crow, Citibank Universal Card Services, 6787 Baypine road, Jacksonville, FL 32256. Attn: Job RV

SOFTWARE CONSULTANT (Atlanta, GA) - Lead & direct application dvlpmnt projects. Review & analyze business needs & design integrated solutions to complex application problems. Work in UNIX & Windows NT mainframe environments using Oracle, C++, Visual Basic & PeopleSoft tools. Perform project mgmt, analysis, design, coding, testing & maintenance of applications or support user req's. Ensure sound program logic & perform post implementation review to ensure all req's are met. Provide internal application support by providing tech & consulting services. Req'ts: Master's degree in Comp Sci, Math or Engineering & 1 yr exp in job offered or 1 yr related industry exp as a Programmer Applications Developer or Consultant, including working with Oracle, C++, Visual Basic & PeopleSoft under UNIX or Windows NT environments. 40hrs/wk; M-F, 9am-6pm. $65,521/yr. Apply in person or send 2 resumes/ltr of qualifications to: North Metro, Job Order # GA 7048811, 2943 N. Druid Hills Rd, Atlanta, GA 30329-0773 or the nearest Dept of Labor Field Service Office for referral to employer

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Computer Programmer/Analyst. $42,984/Yr. BS in computer Science or similar disciplines such as Engineering, Mathematics, or Math-Science, etc. or equivalent by evaluation of exp. & educ. (3 yrs exp = 1 yr college) 20% time per year traveling in the US. 3+ openings. Design and develop databases using knowledge of programming techniques and computer languages. Analyze requirements, procedures and problems to automate processing and improve existing computer systems. Design and implement application softwares which interface with database system and client/server architectured software system. Formulate specifications outlining steps to develop programs required by users. Develop graphical interface programming and communication protocol for client/server application. Write documentation for program development and manual for users. Maintain existing software applications. Perform bug fix/feature enhancement, and provide system support for clients. Apply at the Texas Workforce Commission, Houston, TX or send resume to the Texas Workforce Commission, 1117 Trinity Room 424T, Austin, TX 78701, JO#TX1102456, #1102457, and #1102458.

Software Engineer

Design and develop software systems, including server, middleware and client portions. Min req. BA or BS in Computer Science or related plus 3 yrs IT/related experience; or Master's degree in same. 40 hrs/wk, $75k/yr.

Must have proof of legal authority to work in the United States. Send your resume to the Iowa Workforce Center, 1700 S.1st Ave. - Suite 118. Please refer to job order IA1101497. Employer paid advertisement.

Sr. Business Analyst

San Diego Area

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Enron

keep the systems running," Walker added.

After receiving bankruptcy court approval for the deal, UBS Warburg will assume control of Enron's online trading operations, including the trading facility's vast IT infrastructure.

According to Walker, the investment bank is looking to re-establish the Enron gas and electric trading business using what it believes to be the gold standard for IT infrastructures in the world of online exchanges.

EnronOnline is no small operation. The deal involves thousands of Compaq Computer Corp. PCs, Sun Microsystems Inc. Unix farms and third-party software licenses from Microsoft Corp., Oracle Corp. and Tibco Software Inc., among others. UBS Warburg, the investment banking arm of Swiss bank UBS AG, will license the proprietary software developed by Enron for the trading operation and receive the source and object codes for that software.

A Nice Deal

UBS Warburg will also gain rights to the patents Enron has filed relating to the functionality that allows a single user to buy and sell with multiple counterparts, as well as its automated trading capabilities.

Not a bad bet, considering that the move will cost UBS little. It will pay for the operation, the licenses to use Enron's proprietary software and the office space to house the facilities out of its profits for the next decade. In return, Enron will net 33% of the profits generated by the new trading entity for the first year, with that figure dropping to 22% and then 11% in coming years.

But UBS must woo back shaken traders who have fled to rival exchanges in recent weeks — and that's no easy sell. "Infrastructure's only as good as what you do with it, and nobody's using Enron these days," said Rob Schaffer, an analyst at Meta Group Inc. in Stamford, Conn.

He added that taking over this type of operation was a "staggering" IT job — one that Enron itself probably could no longer afford. "You've got ongoing software licenses, maintenance contracts and the cost to house all these systems," he said. "It costs money just sitting there.

The contract contains a provision for UBS to deduct up to $20 million from its royalty payments to cover the costs of building additional infrastructure, paying fees for transferring third-party software licenses and establishing a disaster recovery facility.

This year, UBS will use Enron's data center in Ardmore, Texas, rent-free. After that, it has the option of leasing the facility or using another.

UBS WARBURG will be hard-pressed to get energy traders like these at Duke Energy to return to EnronOnline.

As part of the yearlong transition, Enron will assist with data networks, active directories, domain management, e-mail, voice mail and on-call support, though UBS will take steps to separate the trading operation and maintain information security.

UBS Warburg will also assume the EnronOnline domain name.

James Walker, an analyst at Forrester Research Inc. in Cambridge, Mass., said he believes that all of Enron's technology is likely to end up on eBay unless UBS pays to keep the intellectual capital of Enron's employee base in order to make the operation succeed.

"You're a star performer, and you knew you were working for the best team," he said. "Are you still working for the best team? At this point, those people are critical."

To move ahead with the deal, UBS Warburg must first get antitrust clearance and permission to operate from the Federal Energy Regulatory Commission before it can restart the exchange, a process that could take up to a month, though there's no firm timetable, said Walker.

Despite UBS's solid financial reputation, it will likely face skepticism in the energy trading market, said Gale Daikoku, an analyst for Stamford, Conn.-based Gartner Inc.'s GartnerG2 service. One upside is that Enron is considered the most established company in the business, and the competitors for the new entity still find themselves in start-up mode, she noted.

Meta's Schaffer questioned whether online trading will prove much of a business for anyone, but he praised UBS Warburg for its move.

"From UBS's standpoint, you're on the edge of this catastrophe," he said. "Why not step in and take the IT resources? No one's looking at IT in something like this, and it isn't costing them a penny."

Enron Bankruptcy Case Highlights E-Mail's Lasting Trail

E-mails are messy entities, leaving little bits of themselves all over the network. That's why the attempts of employees in the Houston office of Arthur Andersen LLC to delete e-mails related to failed commodities exchange Enron were futile.

"It is impossible that [congressional investigators] cannot find data on those hard drives. There are too many computers involved," said Michael Sanders, a computer forensics expert who specializes in e-mail recovery at New Technologies Inc. in Gresham, Ore. "[They] will find enough information to make a story."

As e-mail travels through the network, it leaves bits, and sometimes entire copies of itself, that aren't affected when the Delete button is hit. And that doesn't even take into account the e-mail remnants left on users' hard drives or the periodic backups made of the server contents.

According to published reports, Andersen acknowledges that in October and November, its employees deleted e-mails related to their work as accountants and auditors for Enron.

While e-mail servers and applications vary in how they move and store electronic messages, all of them hoard information on hard drives in the same way if they're running on Windows-based PCs, Sanders said. He added that Lotus Notes is a particularly easy program from which to recover deleted messages.

Arthur Andersen uses e-mail software and servers from IBM's Cambridge, Mass.-based Lotus Software Group subsidiary, according to Lotus CEO Al Zollar. At a conference last spring, he discussed the possibility that Lotus might lose Andersen as a client.

Lotus declined an offer to comment for this story. Representatives for the other companies didn't return calls.

According to John Korsak, product manager for Lexington, Mass.-based Ipswitch Inc.'s IMail Server, a few firewalls are even configured to log information about e-mail passing in and out. For POP3 e-mail, the message spools to a temporary file on the e-mail server while it's being accepted. Though it may stay there for only a millisecond, Sanders said, a message can get stuck in spools, bouncing around from directory to directory.

Enron was using Ipswitch's IMail server, according to a list of technology assets sold to UBS Warburg, the investment banking arm of Swiss bank UBS AG, as part of Enron's bankruptcy proceedings.

Sendmail, a freeware application that is the most common mail transfer agent (MTA), also records a log of all the header information for each e-mail that passes through a server. Once the MTA assigns the message to a directory on a server, it may be backed up to a storage tape. After a user downloads the message from the server, it sits in the in-box view until it's deleted. From there, it goes to the deleted files view, and if deleted from there, it is simply removed from the user's display. But the message is still in the application and remains there until it's marked as free space by a process known as compression, or archiving in Notes. The message remains until the application overwrites it with a new message, which could take weeks or months.

Even then, it will still remain, in part or in whole, on the hard drive in what are known as swap files. If an end user copied the e-mail to removable media, like a floppy disk, the registry would have a record of that activity.

And with Web-based e-mail, the messages would be in the temporary files, even if deleted, until that space is overwritten.

If nowhere else, the data is almost certainly on the hard drive, Sanders said. "As an administrator, that would be the first place I'd look," he added.

– Jennifer DiSabatino

Quick Link For a graphical depiction of the e-mail trail, go to our Web site: www.computerworld.com/q?n1020

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Swat the Buffer Bugs

HERE'S HOW A BUFFER OVERFLOW attack happens: A cracker acquires a popular piece of Internet-related software, such as a Web server or an instant messaging client, and analyzes the code. It's pretty easy to find the input buffers, where anyone on the Net can send a string of data into the system. And it's also pretty easy to find the code that feeds that data into each buffer. If that code doesn't limit the length of the data string, the cracker knows he has a foolproof way into the system.

Or maybe the cracker just tries the brute-force approach, feeding the software a random string that's very, very long. If the software accepts it all, he's in.

Then the cracker writes a program to take over any computer running the vulnerable software and embeds it in a very, very long data string. He feeds it to likely candidate machines across the Net. Some of them will be running the software with the buffer overflow bug. The software on each of those machines unhesitatingly accepts the cracker's very, very long string, which overflows the buffer and keeps filling up the computer's memory until it overwrites the program stack. And as soon as the data input routine is finished, the cracker's code has taken control of the machine.

It's that simple. There's no real guesswork involved, because the cracker can test and refine his attack code on *exactly* the same right-out-of-the-box software he knows a lot of servers will be running. And there's no random risk of failure, as there is with e-mail worms that depend on a user opening an attachment. If the buffer bug hasn't been patched, the attack *will* succeed.

Now, here's how a buffer overflow attack is prevented: The software vendor's programmers make sure their buffer input code limits how much data the buffer takes in, so any very, very long string is cut short and can't take over a computer by overrunning the buffer.

Yeah, that *is* a lot simpler than what the cracker goes through. And it's even more foolproof than the cracker's attack.

And it doesn't take a crew of programming geniuses to make sure input buffers don't overflow, either — just coders who take care to write their buffer code correctly, and code reviewers who pay special attention to making sure that code is right.

So let's review: Buffer overflow attacks are very, very effective. And buffer overflow attacks are also very, very easy to prevent.

So why do buffer bugs still exist? Answer: They shouldn't. There's no reasoo — none, *nada*, zilch — that any piece of software should ever have this kind of hole. Not commercial software, not custom code, oot even the quick hacks that systems administrators slap together to crank through routine tasks.

This bug is so easy to avoid and so dangerous when it exists that you'd think it would be a nonissue. It should be extinct, or at least so very, very rare that it would hardly ever pose a threat.

Instead, buffer bugs are showing up everywhere these days. Microsoft's Windows XP, AOL Instant Messenger, Sun Solaris — we're hearing about buffer attacks on every kind of widely used software that connects to the Net.

Some of the vulnerabilities are in new software, but some have been there for years. That's right: The bad guys are actually researching *old* buffer bugs — that's how popular this kind of attack is about to become.

If 2001 was the year of the e-mail worm, 2002 looks like the year of the buffer overflow.

So check your systems, old and new. Apply every new patch a vendor issues for a buffer overflow vulnerability — and make sure every old patch for buffer bugs has also been applied. Make it priority No. 1.

Otherwise, this could be a very, very long year. ◗

Frank Hayes, Computerworld's senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

SHARK TANK

WHEN A HIGHLY unusual ice storm hits this phone-support center in a Southern city, the phones go out at 10:15 a.m., a pilot fish reports; power goes at 10:45. But two hours later, boss still won't let the staff go home. His logic: "Our California customers aren't dealing with an ice storm, so they'll be at work trying to call us."

BOSS'S LAPTOP screen has been gradually getting dimmer for a while, but now it's gone completely black. "We'll have to send it in to be serviced and maybe order a new laptop for you," says tech pilot fish. But boss balks. "Can't you just change the bulb?"

SEVERAL MONTHS after IT pilot fish installs a new inventory-tracking system, the plant supervisor complains that inventory records are consistently wrong. Fish investigates and finds that users aren't strictly following the written data-entry procedures the fish has specified. "I know they aren't following procedures," supervisor says. "But I didn't want to force them until the data was more accurate."

VP OF R&D asks pilot fish to evaluate digital cameras to use for photographing products. When it's time to present his results to company owners, fish brings in his own digital camera to demonstrate. "Where do you put in the film?" one owner asks. Says fish: "It's a *digital* camera." Owner: "We'd better not purchase one right now, in that case, since neither of us knows where to get digital film developed."

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